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WE are advised from London that the Rio Tinto Company has sold 250,000 tons of pyrites with an option to increase the amount to 500,000 tons for shipment to the United States to large acid makers, the copper contents to be low enough (2½ per cent.) to come in duty free under the provisions of the McKinley bill; the settlement to be based on Ledoux & Co.'s weights and assays.

WE are pleased to learn that the Tamarack Mining Company, in deference to the criticism on its method of figuring out the cost of its copper recently made in these pages, has decided to include its expenditures on construction account in the cost of copper. Our opinion is that expenditures on construction account should not be included in the assets of the company.

CONSOLIDATION is the order of the day in iron and steel works. We learn that the Carnegie interests have purchased the Allegheny Bessemer Works, near Pittsburg, which is the newest of the steel rail mills, thus absorbing a strong competitor. The Carnegie firms have for many years been noted for their policy of absorption, and a list of their acquisitions now includes the Edgar Thomson Steel Works and their nine blast furnaces, the two Lucy furnaces, the Homestead Steel Works, with two converters and sixteen open-hearth furnaces, the Union Iron Works, with its structural and merchant mills, the Lower Mills, formerly Wilson, Walker & Co., devoted chiefly to railroad forgings, the Keystone Bridge Works, the Hartman Steel Works, chiefly devoted to wire and wire products, a controlling interest in the H. C. Frick Coke Company, by far the largest coke producing concern in the country, and finally the Allegheny Bessemer Works.

Other steel concerns have developed the same tendency. Thus the Illinois Steel Company is a consolidation of the North Chicago Rolling Mill Company, which itself owned two steel works, one at North Chicago and one at South Chicago, and an iron works near Milwaukee, with its two competitors, the Union and the Joliet steel works. The Cambria Iron Company absorbed the Gautier Steel Company, and has become the owner of large interests in Lake Superior mines. The Bethlehem and the Pennsylvania steel companies have each become owners in Cuban iron ore mines, and the last named company is building a new plant at Sparrow's Point, Maryland. Of the fourteen steel rail mills in the country, seven of them are already owned by two companies, the other seven being owned by one company each. The consolidation of steel works does not as yet seem to have worked any injury to consumers' interests, as the price of steel for several years past has had a downward tendency.

THE FINANCIAL SITUATION.

The week just closing has seen the culmination, almost in a panic, of a financial condition which has been steadily coming on for several months. During the past twelve months the U. S. Treasury has, more than once, been appealed to to put in circulation all available funds in order to prevent financial disaster, and it has in fact expended in the purchase of U. S. bonds and otherwise all that the Secretary of the Treasury could legitimately so expend, until now the Treasury of the United States is practically empty. Nevertheless, the financial stringency has increased, until during this week it has culminated in a panic that has carried down several important houses.

London is the source of the present trouble, owing to the wild speculation and investment there in unstable securities and wild adventures in nearly every country on the globe. South America has been especially "boomed" in London and has secured there very large amounts of money, and South African mining schemes have also absorbed immense sums. and with correspondingly better results than is usual with English investments in the United States, though on the whole made with more care vestments here, have locked up considerable amounts in property that is unproductive at present and some of which is worthless. Even London, with its almost unlimited financial resources, could not stand this drain, and to fulfill obligations incurred had to sell out American securities which were bought at figures far above those that investors here would give. Consequently their sale here precipitated the decline and final collapse of stocks during the week.

This accounts in a measure for the stringency in money here; but in addition to this there have been investment "booms" in real estate in many States in the Union and a very active business here. Since the middle of 1887, and during this period, large amounts have gone into increasing producing facilities; much of this investment has not yet become productive.

While the financial embarrassment in the market is at present unquestionably severe, there is absolutely nothing in the industrial condition of the country to create alarm or to justify a financial crisis such as came in 1873-4. Values are not in general abnormally high, nor have investments except in cases of "town lot booms" been sunk. The money is in circulation, and though not available to pay for all the securities that might suddenly be dumped on us from Europe, it is in investments here that will not suffer much. The business of the country is extremely prosperous as a whole, and the indications are that it will so continue for some time to come.

The threatened or promised inflation which was to come from the lavish expenditures of the government in pensions, in silver, and in other ways, has not materialized to any great extent, and the present set-back will probably chill it very seriously. The better plan, which consists in reducing government taxation and expenditures to moderate limits and allowing the people individually to expend their own money, may now become the policy of the future. The plan of increasing the cost of production here to a point where we would have little but gold and silver (and not overmuch of these) to send out in payment for our bonds and other securities that Europe has purchased and that may be forced back

on us, is one that invites just such flurries as the present one in the stock market; but it is likely to be modified in accordance with "the will of the people," as recently expressed.

AN ENGINEERING OPPORTUNITY AT THE WORLD'S FAIR.—I.

At many exhibitions held both in this country and abroad, scientific tests have been made of engineering apparatus, such as boilers, engines, etc., the results of which, when published, have formed a permanent and valuable addition to our engineering knowledge and literature. The boiler tests made at the fair of the American Institute in New York in 1871 and those made at the Centennial exhibition in 1876 are good examples. The records of the latter tests have been a valuable standard of reference down to the present time, and they have done much to establish the limits of efficiency toward which all boiler makers now aim, and to prevent useless inventions and experiments to achieve what are now known to be impossibilities in steam boilers. These tests have settled for all time the question as to whether any great difference in economy of fuel, when anthracite coal is used, is to be expected from improvements in the type of boiler itself, and they have proven that the externally fired shell, the internally fired shell, and the sectional or water-tube boiler are all capable of the maximum economy possible with any type. They have, however, left unsettled the question what type, or what modifications of any type, is best adapted to other fuels than anthracite, or what kind of furnace is best adapted to the many different qualities of coal. The economy of automatic stoking, the prevention of smoke, the burning of culm, are also questions upon which our knowledge is sadly indefinite and unscientific.

There is an opportunity presented at the coming World's Fair in Chicago, which, if taken advantage of by the management, will do much toward settling these questions. Chicago has its own troubles now with the smoke nuisance, and it would be more to its advantage than that of any other city if it would take steps to offer prizes, and establish a series of competitive trials, to determine the best method of smoke prevention.

We are not aware at this writing whether or not there are in contemplation by the managers of the World's Fair any competitive tests of any kind, or whether the engineering profession is to be represented in the fair in any other way than as mere exhibitors. It is probable that the more immediately important questions of site, finance, character of buildings, and arrangements of exhibits have monopolized the whole attention of the management, and that nothing has even been considered relating to engineering and other scientific tests. What we have now to say, therefore, we offer as a matter for the consideration of the management, and trust that the engineers of the country, if they approve the suggestions, will urge them upon its attention.

The World's Fair is to be nominally a celebration of the four-hundredth anniversary of the discovery of America by Christopher Columbus. In reality it is to be an exposition of the achievements of America and of other countries in advancing civilization. The principal exhibits will naturally group themselves into five leading classes: 1. Products of the soil. 2. Products of the mines. 3. Facilities for transportation. 4. Machines and manufactured products, including gas, electricity, etc. 5. Education and the fine arts.

The third and fourth classes are the especial work of the engineer. He also has much to do in the way of assisting to produce cheaply the products of the soil and of the mine, but the means by which he does this belong to the third and fourth classes. If there is anything in which the civilization of this century differs from that of all the centuries which have preceded it, it is in its possession of the material things which will be exhibited in these third and fourth classes. It is chiefly due to them that there has been such a vast increase in wealth in this country in the past quarter of a century. The utilization of the forces of nature to do man's work, the transformation of the energy stored up in the coal mines into useful forms—gas, light, electricity, mechanical power—is the chief cause of our rapid increase in wealth, of shortening hours of labor, and of the consequent general advance of civilization. Since the time of JAMES WATT this utilization of nature's forces has been pre-eminently the work of the engineer, and engineering triumphs will be the grandest of all those shown at the exhibition.

But engineers are never satisfied to rest and boast of past achievements. They recognize that there is a vast unknown region in engineering, that in the utilization of the energy of coal there are enormous wastes, and that the knowledge of the conditions on which these wastes depend, and of the best means of overcoming them, is still very imperfect.

Coal is being wasted in every direction. It is imperfectly burned under our boilers, and of the heat generated by its imperfect combustion a large percentage escapes without useful effect. Of the steam generated by the fraction of heat which is saved, only a very small percentage is actually transformed into useful work in the steam engine cylinder. Of the work done in the cylinder a considerable fraction is wasted in engine friction, and in friction of shafting, belts, gearing, and other means of transmission. If the power is applied to the pumping of water or the compression of air there is leakage of valves and friction of pipes, pistons, and other parts of the apparatus; if transformed into electricity, there is leakage and loss by heating. When the power is finally applied in a machine, to shape wood or metal, to weave fabrics, to grind flour, to propel a boat, to draw a cable, there is more friction and waste.

The great desideratum of the engineering profession now is to diminish these various wastes, but in order to do this, more knowledge is needed as to their quantity, and as to the conditions under which they increase or diminish. To obtain such knowledge, careful weighing and measuring, numerous experiments and extensive researches and comparisons are necessary. Opportunities for making such researches and experiments are rare, and they are generally so expensive that private individuals cannot undertake them. Sometimes a government endows them, as when the French Government aided M. REGNAULT to make his researches on steam, and when the German Government aided WOHLER in researches on the strength of materials; but except for military or naval purposes the United States Government rarely takes any steps in this direction.

As already stated, it has been customary at exhibitions to establish competitive trials of machines, engines, boilers, etc., not so much for the purpose of scientific research as for the mere matter of comparing the efficiency of two or more machines, in order to award a prize to the best; but, nevertheless, such trials could not be carried out without some attempt at scientific precision, and the results have, as stated, been of great value to the profession and to the world at large, which have profited by the knowledge gained.

At the Chicago exposition there will be another opportunity to make such tests and researches.

It will be an easy matter for any engineer to suggest what kind of apparatus should be tested, and what should be the character of such tests. The difficulty will be to select from the great number of tests which may be suggested those which are of most importance to the general public, and which will best warrant the expenditure necessary for the testing apparatus, and for expert services in making the tests. The whole matter should be considered carefully by a commission of engineers, who should lay out the plan of the work and establish the rules under which it should be conducted, and by a committee on finance, who should provide the funds for the expenses of the tests and for prizes.

(TO BE CONCLUDED.)

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Carson Mint Records.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: We are glad to be able to advise you that we have received from Mr. E. O. Leech, Director of United States Mints, a letter advising us that he has instructed the Superintendent of the Carson Mint to "furnish the Mining Stock Association with any information which the books or records of the mint will disclose relative to the names of persons making deposits or sales of bullion and the mines or localities where produced."

This is certainly broad enough to enable us to get at what we need at present, and we are pleased to have this support from the United States officials, and they deserve full credit for giving it to us.

MINING STOCK ASSOCIATION,
SAN FRANCISCO, November 6, 1890. per J. H. TINGMAN, Vice-President.

The McArthur-Forest Cyanide Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Having noticed in your issue of November 1st the communication from W. H. Furlonge regarding the McArthur-Forrest cyanide process for the extraction of gold from ores, and your request for information from any one having any knowledge on the subject, I take pleasure in stating that I have visited the works of the McArthur-Forest Company, in Glasgow, Scotland, and investigated the process afterwards atamine in the S. E. Wynadd, India, on a practical thousand-pound scale. Regarding data and results of these trials I am in duty bound to reticence, although since my return I have made experiments in the laboratory on a California quartz, with a 1 per cent. solution, and obtained an 88 per cent. result.

There is in my opinion, merit in the process when used on certain ores, and under certain conditions. I hope soon to be able to present to you some results in detail. RICHARD EAMES, JR.

GAP CREEK, N. C., November 10, 1890.

The Utah "Mineral Wax."

EDITOR ENGINEERING AND MINING JOURNAL.

SIR: In your issue of July 6th, 1889, there appeared a paper on "mineral wax" in which the variety found in Utah was described as "composed of several members of the paraffin series which are represented by the general formula $C_n H_{2n+2}$ and perhaps certain of the olefines;" also it was there stated that "sulphuric and nitric acids and alkalies have no effect on it." These two statements were somewhat arbitrarily contradicted in your next issue by Mr. Henry Wurtz, who claimed that the material referred to was chiefly composed of the olefines series and readily attacked by sulphuric acid. A rejoinder appeared in the ENGINEERING AND MIN-

ING JOURNAL of July 20th over my name in which authorities were cited corroborating the original statement.

Subsequently while discussing this question in the chemical laboratory of the University of Pennsylvania, Prof. Samuel P. Sadtler very kindly agreed to examine the wax for me. Through the courtesy of Mr. Jacob Wallace I was able to send him a typical specimen of the Utah ozokerite, which has since been investigated in his laboratory. The results obtained have been embodied in a paper by one of his students, a copy of which is herewith sent you.

It appears from the chemical evidence obtained by Mr. Seal that the facts as originally stated were correct. No analysis, as far as I know, has ever been offered by Mr. Wurtz to sustain his views, and the experimental data now available so completely disprove his statements that it becomes a matter of grave doubt as to whether the substance which he reported on was similar to that analyzed by Prof. Spencer B. Newbury in 1879, and by Mr. Seal in 1889. MARCUS BENJAMIN, Ph. D.

NEW YORK, October 31, 1890.

Difference in Depth of Oxidation in the Wet Mountain and Sareng del Christo Mountains in Colorado.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It is generally assumed that the change that many veins are observed to undergo, on being penetrated from the surface downward, is the result of chemical action induced by atmospheric agencies. The depth to which such changes may extend is variable and differs in different countries, and even in different sections of the same country. Climatic differences are usually assumed in proportion to the extent of depth penetrated, coupled with a possible difference in the porosity of the country rock. I will, however, endeavor to show that climatic differences alone fail to account for all the facts involved. For instance, the Wet Mountain Range and the Sangre del Christo Mountain Range are separated from each other by the Wet Mountain Valley, which has a width of 8 to 12 miles; both ranges are relatively high, and, with the exception of the higher peaks of the Sangre del Christo mountains, may be said to enjoy practically the same climatic conditions. Yet the ores that occur on the Wet mountains in fissure veins have become oxidized to much greater depths than those on the Sangre del Christo mountains of the same kind. Indeed, as a matter of fact, while the pyrite veins on the former are changed into oxides and carbonates to quite considerable depths, those on the latter are, as a rule, unaltered, the copper presenting itself as pyrite, gray copper, etc., to the very surface of the vein.

What, then, we may ask is the cause of this marked difference in the depth to which oxidation has been carried in these two mountain ranges, situated so near to each other? Any one who has reflected upon what must be the difference in the rate of denudation of these two mountain ranges will not fail to recognize the true cause. The Wet mountains (speaking paradoxically) are relatively dry, there being but few streams on them that do not dry up during the summer months, and, the mountains being mostly Archean, denudation proceeds at a relatively slow rate. The Sangre del Christo mountains, on the other hand, are everywhere marked by abundant waterflow; almost every gulch or ravine has a stream that is continuous winter and summer alike, and the mountains instead of being Archean in character, are mostly made up of limestones, shales, sandstones and coarse conglomerates of the carboniferous period. Denudation is here in consequence relatively rapid. Is it not probable that herein lies the true explanation of the difference that is observed in the extent to which atmospheric agencies have penetrated?

On the Wet mountains every shade of change counts; it accumulates year by year, and gains upon the rate of denudation. But on the Sangre del Christo the reverse is the case; the process of denudation goes on as fast or faster than the process of oxidation, and thus destroys year by year the evidence of atmospheric change on the ores. THOMAS CHARLTON.

WEST CLIFF, COLO., October 17, 1890.

[Our correspondent may not take full account of the depth of the drainage level in each case. The fact that the water disappears on the Wet Mountain, while it remains on the surface of the Sangre del Christo range, seems to demonstrate that on the former it finds subterranean outlets at a considerable depth, and, as might be expected, oxidation and other changes due to atmospheric influences will extend to the drainage level only in each case.—ED. E. & M. J.]

Silver Production of Germany.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: My attention has been directed to a letter signed Bruno Wetzig, which appeared in your JOURNAL of the 8th inst., dated La Puebla De Guyman (presumably Guzman), Spain, October 18th, 1890, purporting to give the silver product from German mines, by districts, for the year 1888.

In this letter Mr. Wetzig makes it appear, and gives figures to substantiate it, that the product of silver from German mines approximates 200,000 kilograms annually, and that the silver product of German smelting works was for 1888 about 291,000 kilograms.

Mr. Wetzig does not state *where* he *got* the figures which he uses. A large portion of them are *round estimates;* but the entire statistics are so incorrect that I am surprised that you published them.

In the first place, the total value of the gold and silver ores produced in the German Empire in 1888, according to official statistics, was 4,069,000 marks, while the total product of silver by the smelting works of Germany for the same year was 406,602 fine kilograms.

According to the Monatshefte zur Statistik des Deutschen Reichs for February, 1890, the official statistical publication of the German Empire, the product of silver from the mines of Germany was:

	Tons.	Value in marks.
Saxony	20,326	4,027,378
Other German states	63	41,223
Total German Empire	20,389	4,068,601

I had thought of writing an elaborate reply to this misleading statement of Mr. Wetzig's, but before doing anything in the matter I would like to know who the individual is, what standing he has, and what facilities for obtaining information in regard to the product of German mines which the public generally does not possess, and which are not contained in official statistical publications of the German Empire.

Possibly you could inform me on these subjects, or you might ascertain from Mr. Wetzig *where he obtained* the statistics published in your JOURNAL of the 8th inst.

You are probably aware that Dr. Soetbeer has been in the habit, in his statistics, of crediting Germany annually with the silver product of its *smelters*, although he admits that the bulk of the silver obtained in the German Empire is from foreign ores and furnace products imported into that empire for the purpose of economical reduction.

In a paper presented by him to the recent Paris Monetary Conference he called attention to the fact that the essential difference between his estimate of the silver product of the world and that of the Director of the Mint lay in this fact.

I contend that it would be just as correct to credit the silver obtained from Mexican ores smelted in the United States as a portion of the silver product of this country as to credit the amount of silver obtained from South America and other foreign ores smelted in Germany to that country. Indeed, on the same principle, if all the South American ores were shipped to Germany for reduction, Germany would apparently be one of the largest silver producing countries in the world, while South America would produce no silver. As a matter of fact Germany is one of the most insignificant silver producing countries in the world, its product being obtained mostly from the desilverization of lead ores, and amounting to about 30,000 kilograms annually. E. O. LEECH, Director of the Mint.

WASHINGTON, D. C., November 13, 1890.

The Mining Engineers' Transactions.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Allow me to enter a protest against the method adopted by the Institute of Mining Engineers in publishing its Transactions, as exemplified in Vol. XVIII., just issued. Here we have a magnificent, bulky volume of over 900 pages, besides an index and numerous folding plates, containing about 70 technical papers. According to the report of the proceedings of the meetings, of the 70 papers 44 were "read by title"—that is to say, the papers were either not ready for presentation at the time of the meeting, or, if ready, there was not time to read them. Looking through the volume, it does not appear that any of the papers, even those that were read, were discussed, with only one exception. If the papers were actually discussed the discussions have not been published.

A very small minority of the members of the Institute attend the meetings; and, as shown at the recent New York meeting, many of those who come for social reasons do not attend the sessions for the reading of papers. The great majority get the benefits of membership only through the published volume. In the case of Vol. XVIII., they obtain 70 professional papers, some of high merit, some of less, but all just as they came from their writers, except possible improvements made upon them by the secretary in editing them, but without any discussion, and which will give the opposite side of a disputed question or throw new light upon a dark subject without that careful revision which comes after discussion. A paper may contain misinformation, inaccurate statements, false theories, but if there is no opportunity for discussion how are these defects to be discovered and the antidote to them applied? If such defective papers without criticism or discussion are published in permanent form in the Transactions, an injury may be done the members by presenting them with misleading papers with the stamp of the Institute upon them, which notwithstanding the caution which was formerly printed that "The Institute is not to be held responsible for opinions expressed by its members," or words to that effect (which I do not find in the present volume), gives a sort of sanction and approval to them. An injury is done further to the whole engineering profession in increasing if its already too great stock of bad engineering literature is increased by defective or misleading information.

If there were no better way of handling the papers presented to the Institute, we might be satisfied, and say we receive our ten dollars' worth, and more, too, in the handsome annual volume; but there is a better way. Our British friends showed it to us at their New York and Pittsburg meetings. Their papers were printed long enough in advance of the meetings to be given to those interested who might wish to take part in the discussion. In consequence the papers themselves were, if long, read only in abstract, and written discussions, carefully prepared in advance, were read, and additional time was given for verbal discussion. No one who attended the sessions of the Mining Engineers in New York, and then the sessions of the Iron and Steel Institute, held the same week, could fail to notice the difference, to our discredit. No one can take up a volume of the Transactions of the Iron and Steel Institute without being impressed with the importance of full discussion of the papers. No bad paper is printed in their volume, except with its antidote immediately following.

But we do not have to go abroad for an example of "how to do it." The American Society of Mechanical Engineers has had for more than five years an admirable system of the reception, discussion and printing of papers, which has given the most thorough satisfaction to the members, has made its meetings highly interesting and has improved the quality to its Transactions. Papers presented to the Society must be in the hands of the secretary six weeks before the date of the meeting. They are passed upon by a publication committee and those that are accepted are then printed. The following extract from the rules shows what then takes place:

"Copies of all the papers to be read shall be sent to every member signifying his intention to attend.

"At the convention, papers shall be read by abstract only, not more than five minutes being allowed to the presentation. It is assumed that every one has made himself familiar with the papers beforehand.

"Members who have given notice of their intention to discuss any papers and shall have reduced their remarks to writing shall be entitled to ten minutes for their presentation; extemporaneous discussion from one person is limited to five minutes at any one time.

"Authors may have the last five minutes of the time allotted for a paper and discussion, to close the debate.

"The time available for papers at every meeting shall be so allotted to the several papers as to secure favorable presentation of them all.

"These rules may be suspended in any session by unanimous consent. Their whole object and tenor is to favor well-considered discussion by giving all available time for it, and a chance for every paper."

The whole discussion is taken down in short hand, and type written in duplicate. Each member who takes part in the discussion is furnished with a type-written copy of what he said, for revision. The revision by the author frequently goes so far as to suppress what he said as unimportant, or spoken too hastily, and the whole discussion is finally edited by the secretary. The result is that frequently the discussion, both as spoken

and as printed, is better than the paper. It gives zest to the meetings, and furnishes an antidote to bad papers, if it does not lead to their entire suppression.

I write as above with more confidence, because I know I am not alone in my opinion concerning the conduct of the meetings and the method of publication of the papers. There is a strong undercurrent of sentiment throughout the Institute in the same direction, although it has not found much open expression. Perhaps this letter may lead to the publication of other opinions on the subject, and eventually to a reform in the methods of the Institute.

At the New York meeting of the Institute one step forward was made. Some of the papers were presented at the meeting in printed form. Their vast bulk, however, and the fact that only those that attended the sessions got copies of them, and they only at the session itself, gave no opportunity for reading them, so that they could be intelligently discussed. Too long time was also taken up in reading the few that were read. They should have been read in abstract. A beginning has thus been made. Let it be continued to the extent that no paper is presented at a meeting which has not been distributed to those members who expect to attend, at least two weeks beforehand. that no paper shall be allowed over five minutes for its presentation, and that all papers shall be discussed, or at least an opportunity given for this discussion, and finally that no papers be read by title.

A MEMBER OF THE INSTITUTE.

NOTES ON RECENT IMPROVEMENTS IN GERMAN STEEL WORKS AND ROLLING MILLS.—II.*

The requirements of the basic lining have led to material improvements of the Siemens regenerative furnace. Hearth, flues and regenerators are now made independent, in order to secure the greatest possible accessibility for rapid repairs. These changes have made it practicable to enlarge the regenerators and design them in a more rational form. As a result, higher temperatures have been obtained with exceedingly economical fuel consumption, and the duration of each heat has been reduced with a corresponding increase in daily output. Six 12-ton charges, each consisting of 8 tons of pig and 4 tons of scrap, are now run in 24 hours, with a fuel consumption of 300 kilograms of coal per metric ton of ingot iron of the softest quality.

In the instance here illustrated, the casting house is common to both converter and open-hearth plant, and forms the connecting link for both with the soaking-pits *A*, the blooming-mill *W*, and the finishing-mill *F*. Soaking is carried on upon a large scale, especially in plain (unfired) pits. This system is continually extending in practice. It is particularly adapted to the working of the blooming-mill, because it permits the use of very heavy ingots of uniform size, and thus simplifies the work of the casting department. Moreover, since the further reduction of the blooms without wash-heating to $\frac{1}{100}$ or $\frac{1}{150}$ of the original cross-section has been proved practicable, the soaking-pits effect in that direction also important savings; and it is to be expected that they will find general use likewise in connection with the products of finishing rolls, such as rails, ties, etc.† The plain pits require for their successful operation a regular running of the steel works with a large product. To maintain these conditions, not only a close and careful control of the various processes is necessary—which is in itself an advantage to any establishment—but the construction, arrangement and proportioning of all departments must be exactly adapted to the needs of continuous running. Since this is seldom the case in existing works, which have been more or less remodeled in single departments and retain many antiquated features, the introduction of soaking pits may be delayed in these until complete reconstruction has become imperative.

The number of the plain (unfired) pits is so adjusted that ingots of 1,000 to 1,500 kilograms may remain in them 40 minutes. The loss of metal by oxidation during soaking and rolling, taken together, amounts to one per cent. The fired pits are provided with either gas-firing and regenerators or with grates and air-heating. The consumption of coal is 2½ to 3½ per cent., and the loss by oxidation 1½ to 2 per cent.; while a heating furnace consumes 5 to 6 per cent. of coal, and causes 2½ to 3 per cent. of loss by oxidation. At the same time the service and the maintenance of the pits are less expensive. They are served by the cranes *N*, all the motions of which are controlled by hydraulic pressure. Of these hydraulic cranes, which have many advantages over the simple lever cranes, there are various designs in use.

The blooming trains are mostly two-high and driven by reversing engines. The diameter of the rolls has increased from 900 to 1,100 millimeters (35·4 to 43·2 inches); those of the last named size being capable of reducing the ingot diameter ½ at each pass when the driving machinery is adequately heavy. For this work the engine, using 75 pounds steam pressure, has a cylinder diameter of 1,300 millimeters (51 inches), stroke, 1,500 millimeters (59 inches), and a reduction by gearing of 1 : 2½ or 1 : 3, so that the number of revolutions per minute is 120 to 130.

The feed rollers for moving the ingot before and behind the blooming rolls need special care in construction, because they are subject to breakage of their motive parts, due chiefly to the frequent and sudden reversals of motion to which they are subjected. It is therefore advantageous to operate these feed rollers by belt transmission, because this gives a lower initial velocity at every reversal than does a directly applied reversing engine.

Of the reversing engines *R*, which drive the rolls, various designs are in use. That which combines a vertical and horizontal cylinder has the advantage of conveying all the power through a single straight shaft; but engines with three horizontal cylinders have lately been adopted in many quarters, because calculations show that they can be run with a higher degree of steam expansion in the cylinders.

Blooming-mills are employed chiefly in the production of blooms for rails, shapes and billets. For the plate mills it is more customary to use bottom-cast ingots from narrow plate-molds.

The bloom shears *S*, Fig. 1, are represented by many different designs, and are provided with horizontally or vertically-acting blades, according to their special work. Most of them are operated with hydraulic pressure (up to 500 atmospheres), which is furnished, for the sake of simplicity, by a steam jack close by the shears. This consists of a vertical steam cylinder with single-acting piston, on which the steam presses from below, the upper prolongation of the piston rod constituting a water plunger in a smaller cylinder, where the pressure is, of course, in the inverse ratio of the two plunger areas. The high-water pressure works upon the pressure plunger of the shears, and, after the cut is ended, the water returns into the smaller cylinder. It may be remarked, in passing, that this system is much used for hydraulic presses and lifts in metallurgical works, because it dispenses with the accumulators, long conducting pipes and valves under heavy hydraulic pressure, which are so difficult and costly to maintain, when hydraulic power is derived from steam pumps in the old-fashioned way.

After many experiments, this construction was at last made practicable only by means of an arrangement for regulating the speed of the steam piston by that of the water. In this way a considerably higher number of strokes per minute has been attained than is the case with shears driven by rotary motion. This number ranges up to 25 strokes per minute. The beginning of the cut is determined by the operator, so that the danger of waste by cutting too short is avoided.

For the further reduction of the blooms to rails, ties and shapes three-high rolls are very generally used. The diameter of the rolls ranges up to 800 millimeters (31·4 inches), which is sufficient for the rolling of ingot-iron I-beams 400 millimeters (15·7 inches) high and 16 meters (52·4 feet) long.

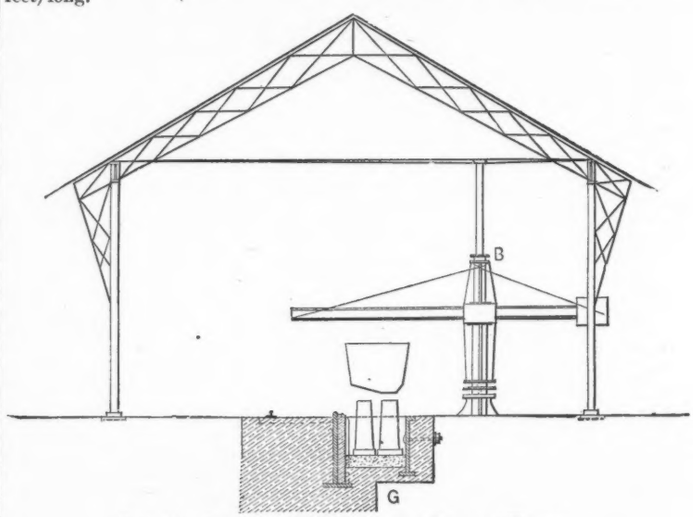

FIG. 14.—CROSS-SECTION THROUGH CASTING HOUSE.

In these operations the most approved form is the three-high mill with fixed middle roll, and upper and lower rolls adjusted both horizontally and vertically. The upper and lower pressure screws receive each a clogged gearing, by means of which they can be operated by a workman standing on the floor at the side of the housings. Such a three-high train requires but three sets of rolls, while a reversing two-high train must have five sets in order to roll, from blooms, I-beams up to 400 millimeters (15·7 inches) in height. In view of the large product of 300 to 400 metric tons per day, the larger number of workmen required for the three-high mill is less important than the larger consumption of steam for running the two-high. The movement of the pieces to be rolled takes place wholly upon hand levers, which are connected with a steam lift, so that the trains of feed rollers before and behind the mill, which are so expensive to install and maintain, are dispensed with. It is, therefore, easy to understand that the three-high form is decidedly preferred for rolling mills, and that the two-high is resorted to only when the dimensions of the product require it.

In the manufacture of plates, the three-high mill, with loose middle roll (Lauth's system), is largely used, especially in preliminary rolling for the sheet mills. For the production of heavy plate (boiler plate, etc.), the following dimensions are employed in one establishment: Diameter of rolls, 900 millimeters (35·4 inches); length, 3,400 millimeters (133·6 inches). The reversing rolls for armor plate, on the other hand, have as high as 1,200 millimeters (43·6 inches) diameter and 4,000 millimeters (157·2 inches) length. In one establishment such rolls are made of forged cast-steel. The three-high train with loose middle roll has also been successfully used for universal mills; in which case, however, the vertical rolls come into play during the pass in one direction only.

I would add, in conclusion, that several German manufacturers of machinery have furnished, at my request, drawings and photographs of their improved devices, and that I shall be happy to give to those who may feel an interest in the matter more detailed explanations than the foregoing pages contain.

The committee of the American Society of Mechanical Engineers that attended the joint meeting of delegates from several societies at Chicago, on October 12th, held for the purpose of considering the advisability of establishing an engineers' headquarters at the World's Fair, has made a report in favor of the project. They also recommend that an international congress of engineers, lasting six days, be held during the exposition, the proceedings to be conducted in the English language. The great success of the recent joint meeting of the English, German and American metallurgical societies is a strong argument in favor of the proposed congress.

* A paper read by R. M. Daelen, Dusseldorf, Germany, New York meeting, September, 1890, American Institute Mining Engineers.

† In the rolling of rails from 15 by 15-inch ingots the cross section is reduced to about 1-40th.

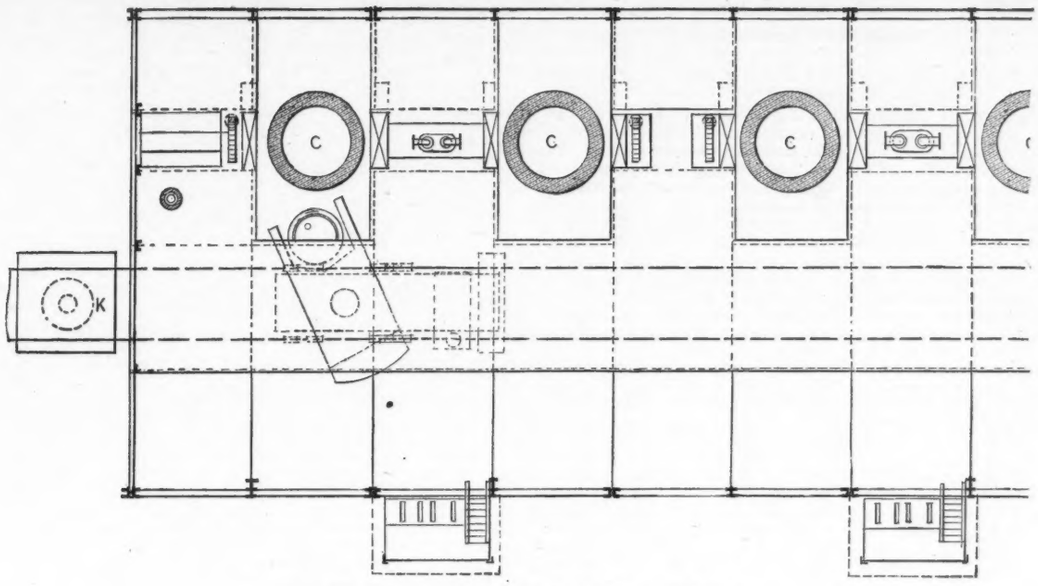

FIG. 11*a*.—PLAN OF CONVERTER AND CASTING HOUSE.

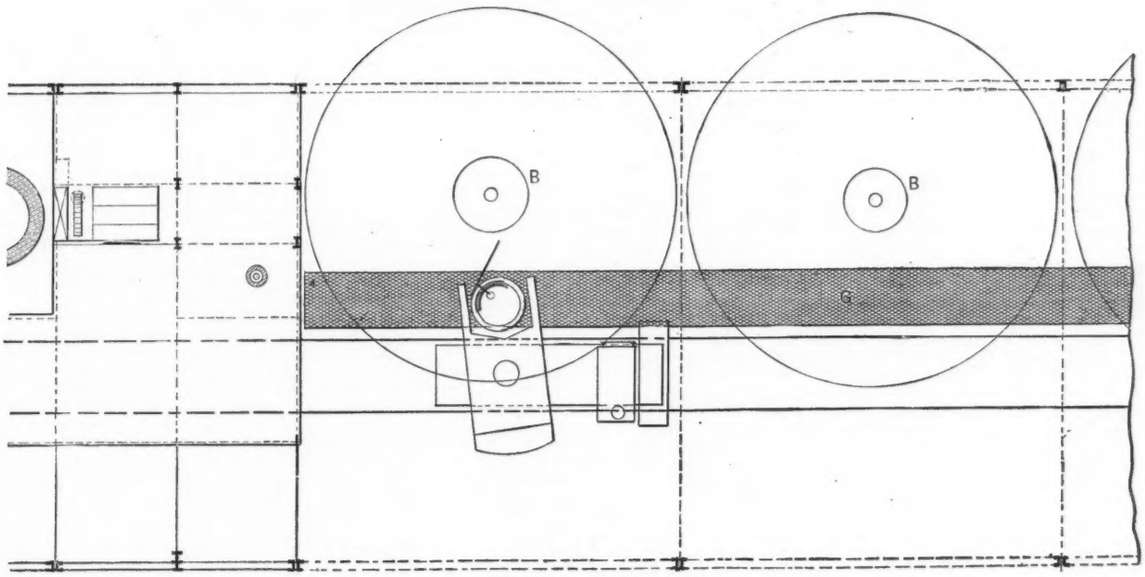

FIG. 11*b*.—PLAN OF CONVERTER AND CASTING HOUSE.

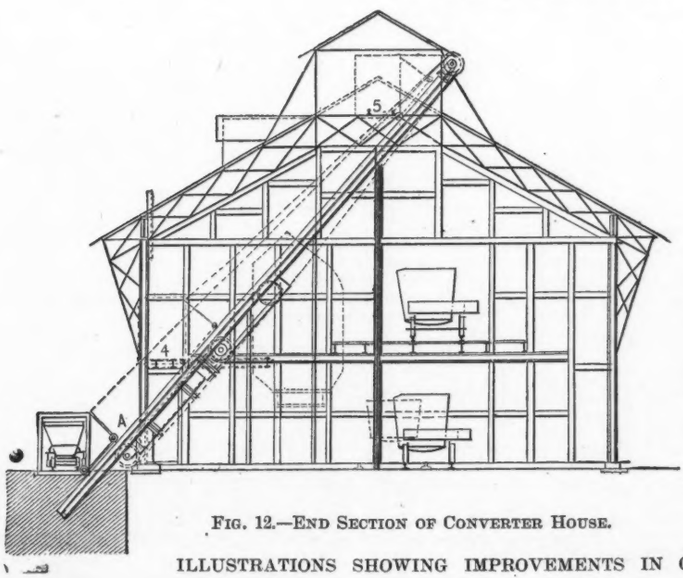

FIG. 12.—END SECTION OF CONVERTER HOUSE.

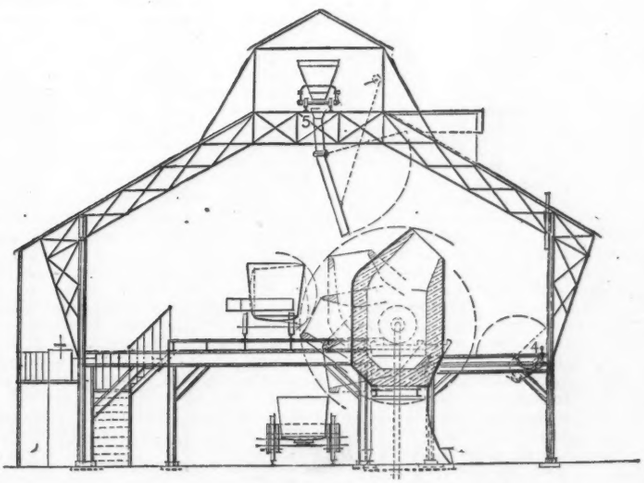

FIG. 13.—CROSS-SECTION THROUGH CONVERTER HOUSE.

ILLUSTRATIONS SHOWING IMPROVEMENTS IN GERMAN STEEL WORKS AND ROLLING MILLS.

MATTE SMELTING.—II.

A Discussion of the Apparatus Used.

Written for the Engineering and Mining Journal by Herbert Lang, Mineral, Idaho.
(Continued from page 125, August 2, 1890.)

The time-honored discussion upon the comparative merits of the blast furnace and the reverberatory in copper ore smelting, commonly designated as the German *versus* the Welsh methods, receives a new impetus from the general extension of the smelting processes in the domain of precious metal extraction, and in consequence of the improvements in both styles of furnace and their connected apparatus. The advocates of each find themselves in possession of novel and potent arguments with which to assail their opponents and protect their own positions. In metallurgical processes, as in most other things, we follow largely the dictates of fashion and of tradition. Thus a few years since, the fashion—dictated, I presume, by the overwhelming spirit of Freibergism which then prevailed largely, as every one remembers—held ground strongly in favor of the German method of furnacing, and the blast furnace was and generally is yet held to be without a peer for copper extraction.

Consequent upon its successful introduction into American lead smelting, whereby there was created, as Dr. Peters truly remarks, a distinctively American metallurgy, the water-jacketed blast furnace was tried and found in its improved form quite as efficient an agent in black copper and matte smelting, and the great deal of inventive genius expended upon it and its accessories has resulted in an apparatus having a great range of usefulness and of considerable perfectness in design and construction, and whose merits have been fully recognized. That this apparatus will be additionally improved, and its usefulness still more largely increased, I do not in the least doubt; it were an insult to the intelligence and zeal of American metallurgists to think otherwise. But during these years, while attention has been almost entirely given to the blast furnace, the reverberatory has sunk into comparative obscurity, and metallurgists, as a rule, have been oblivious of the fact that it too has been susceptible of improvement; until now at last we are awakened to the fact that in competent hands, and under the direction of men like Mr. Pearce, of Argo, the performances of the lately neglected reverberatory actually rival and in many respects surpass the best work of the blast furnace.

The character of the work done in reverberatories at Anaconda and Argo is convincing proof of the erroneousness of the prevailing impressions concerning this style of furnace and is being the means of raising up new advocates for it, who have previously given in their adhesion to the blast furnace under almost all conditions. Thus Dr. Peters, who sum up a weighty chapter, written several years ago, on blast furnace practice with strong words of approval of it as against the reverberatory, relegating the latter to its early home in Swansea, has of late ingenuously confessed a much increased appreciation of the latter, whose use he would advise in many cases where he would lately have preferred the rival apparatus.

Mr. Vivian, of Swansea, in his celebrated and widely read lecture on Copper Smelting, though a most strenuous advocate of the reverberatory, felt called upon to acknowledge that the slags made in that furnace invariably carried off more of the valuable metal than did those made in the blast furnace. Subsequent writers, the most of whom have advocated the blast furnace, have adopted—I will not say confirmed—this view, though I can find no evidence upon which it can be based. I do not believe that there is the slightest ground for asserting that a slag of a given composition, produced in conjunction with copper matte, will be cleaner if made in the cupola than in the reverberatory. True, we may have slags so viscid that they will not allow the matte to separate; but as such cannot be used in the cupola, there is no ground for comparison in this case. Neither do the highly siliceous slags, then made by Mr. Vivian, afford any good ground of comparison, though any comparison must be favorable to the Swansea method, as they contained over 60 per cent. of silica with but one-half per cent. of copper. Such a slag has not been and probably cannot be made in the cupola, and this brings us inadvertently face to face with another important superiority of the reverberatory, sufficiently acknowledged, however. Mr. H. M. Howe, in his excellent treatise on copper smelting (*Bulletin* 26, *U. S. G. Survey*), has collated examples of various copper slags which afford evidence as bearing upon this question of the comparative cleanness of such slags. Thus the average contents in copper of seven examples of reverberatory slags are 0·628 per cent.; the average of ten examples of blast furnace slags is 0·746 per cent. Discarding the highest one of each set, as showing abnormally, I find the average of the rest reaches 0·53 per cent. in each case; so that as far as the small number of analyses shows, the losses average alike.

At the Boston & Colorado works at Argo, previously cited, the proportion of matte produced to the ton of ore being very small, the silver losses are but 1½ ounces per ton of slag, on the average, and at the Willows matting establishment, in the Transvaal, where they use reverberatories and make a matte containing nearly 500 ounces silver per ton, the losses per ton of slag are two ounces silver and one-half per cent. copper. In both these works it should be noticed that the silver is mainly worked for instead of copper; but the principles of smelting apply equally, and the furnaces used are the same as used in the extraction of the other metal. Treating the same mixtures, it would be impossible for any blast furnace to surpass these examples of close work, which, considering that they are the averages of long campaigns, are certainly remarkable, and show very well the perfection to which this form of smelting has been brought. Finally, all the evidence in my possession tends to prove that any given slag will be decopperized and desilverized by the matte to the same extent whether it be formed in the blast furnace or in the reverberatory. The assumption which has passed unquestioned for so long, that the blast furnace makes cleaner slag, seems erroneous therefore and should be discredited.

Mr. Howe, in the work cited, and Mr. James Douglas, in *Mineral Resources*, 1882, have dwelt at length on the comparative advantages of the two methods of smelting, and to their summing up it is unnecessary to add. There are, however, certain considerations not touched upon by those gentlemen, which are of a practical nature, and therefore deserving of mention. It has been said by Vivian that the reverberatory is a simple and easily managed furnace, and Doctor Peters leaves it to be inferred that it is easier to manage than the blast furnace. This is a point worth emphasizing. I would add that it is incomparably easier, and when only the production of a first matte is the object, its requirements are wonderfully simple as regards the skill of the director and the operatives. However, I must make exception in case of such operations as are carried on at Argo, where the magnificent result of smelting a daily average of 26·8 tons per furnace is attained mainly by the exercise of very exceptional skill and experience. For ordinary matting operations I consider ease of management a very important consideration, which should rarely be sacrificed; for the burden of management being left usually upon one man, that individual's energies should not be outworn by such harassing annoyances as are incident to such wearisome methods of operation as blast furnace smelting often proves.

I find the cupola advantageous because the men attending it are driven to keep up with it; whereas the reverberatory does not stimulate them to the same extent, and their *vis inertiæ* is allowed to prevail. It is different where two or more reverberatories are worked side by side; for here the men naturally fall into or are coaxed into rivalry and a great deal more work is got out of them. These considerations should be allowed due weight in deciding upon a process, as also should this fact that the ore smelting reverberatory requires but a single class of skilled operatives, the skimmers, while blast furnaces need several.

We are assured that the cost of repairs on reverberatories exceeds those of the water-jacketed blast furnace. This may well be so in the majority of cases; but there is an important difference in the nature of the repairing which offsets any disadvantage suffered by the reverberatory. For, whereas the resources of a complete machine shop are taxed to replace some perhaps costly piece of machinery without which the blast furnace plant is useless, the repairing of the other furnace is usually limited to replacing a few fire-bricks, which may often be done without cooling down the structure, and it is not often that the repairing extends to the iron work. For this reason a reverberatory campaign may last for months, while blast furnaces, at least in isolated districts, may be said to be forever on the point of shutting down.

It is to be esteemed one of the most favorable features of the reverberatory process that ores in a state of minute subdivision have no bad influence on the working of the furnace, whereas in the other mode of smelting no worse obstacle is known. Again, the copious formation of flue dust, which causes an inevitable and sometimes, unless checked by dust chambers, a very heavy loss, is reduced to an unregarded minimum in the reverberatory.

These objections to the blast furnace were urged by Vivian, who also alluded to the troublesome formation of "iron sows," as a regular accompaniment of European, and especially of German, smelting at that time, now some seventeen years ago. The latter objection has lost its force in consequence of the adoption of outside separating basins in blast furnace work. It remains to be said that the reverberatory bottom absorbs a large amount of valuable metal, which lies there as unproductive capital during the life of the furnace. The value of the absorbed metal is likely to reach several thousand dollars in silver matte.

It is a matter of great moment that the reverberatory employs no machinery; that the water supply is of little importance; that fewer men are used, and the labor requirements are less complicated. The chemical work made necessary in blast furnacing is much reduced and often, perhaps injudiciously, brought to a minimum in reverberatory work. Such considerations apply more particularly to small and isolated plants, remote from centers of population, and subject, therefore, to influences which would not be felt elsewhere or felt less strongly. Of so much weight are many of these that I do not hesitate to recommend the reverberatory for such small and isolated plants, in most cases, especially where the ore supply is limited but the fuel suitable. It is in reality these small plants that need the greatest knowledge and skill on the part of the designer; for, whereas a plant located in a center of trade and population finds its requirements fully met in every respect as to labor, ore mixture, fluxes, fuels and refractory materials, the essentials of successful work are often almost unattainable in the mining camps, where the absence of a single one may bring pecuniary disaster. The simpler the requirements are, therefore, the more likely it is that success will follow.

Notwithstanding the improvements in efficiency which have been made in the copper-smelting reverberatory in the last decade—improvements which have resulted in trebling its daily capacity and diminishing its cost of smelting by one-half—there is no doubt that it is destined to even greater improvement in the immediate future. In the expectation that the coming improvements will take the following forms, I venture to predict: The general adoption of gas-firing; the introduction of regenerators for pre-heating to a high temperature the air and gases for combustion; the use of movable roofs to facilitate repairing and settling; whereby are made possible: Still larger furnaces; better construction of the radiating surfaces; an extension of the principle of basic hearth linings for basic slags, with, of course, the retention of acid ones for the acid slags; and, finally, water-jacketing certain portions of the reverberatory most exposed to wear, as the door jambs, vulcatory, and perhaps the bridge, in imitation of Lash's open-hearth furnace, which successfully uses water-cooled skewbacks supporting portions of the roof.

Mineral Statistics of Hungary.—In the following table, for which we are indebted to *Gluckauf*, the production is given in kilogrammes, and, where so indicated, in metric tons:

	1888.	1889.		1888.	1889
Gold	8,740	10,720	Asphalt and mineral oil	5,549,500	3,041,100
Silver	82,100	83,400	Litharge	636,900	1,742,200
Copper	1,852,600	1,476,400	Sulphuric acid	4,184,200	9,966,000
Lead	9,657,300	11,544,900	Manganese ore		9,733,700
Antimony ore	959,600	5,373,700	Sulphuret of carbon	497,600	937,600
Antimony pig and regulus	1,470,900	1,643,200	Puddle iron, m. tons	213,500	248,500
Cobalt and nickel ore	1,627,300	1,769,200	Foundry pig, m. tons	11,023	14,147
Cobalt and nickel regulus	184,800	228,800	Coal, m. tons	935,800	1,031,200
Quicksilver	50,200	51,000	Lignite, m. tons	2,061,621	2,145,248
			Briquettes, m. tons	25,729	25,076
			Iron pyrites, m. tons	50,555	57,658

RICHMOND MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

One of the most successful meetings ever held by this flourishing society was held at Richmond, Va., November 11th to 14th. About 150 members were present, together with 50 ladies. Nineteen technical papers were presented and discussed. Reports were presented by special committees on Methods of Testing Materials, Duty Trials of Pumping Engines, Tests of Locomotive Efficiencies, and Uniformity of Flanges of Pipe Couplings.

The following officers were elected: President, Robert W. Hunt, Chicago; Vice-presidents for two years, Stephen W. Baldwin, New York; John F. Parkhurst, Cleveland, and Alexander Gordon, Hamilton, O. Managers for three years, Andrew Fletcher, New York; W. R. Warner, Cleveland, and Coleman Sellers, Jr., Philadelphia. The social part of the meeting included a reception by the Governor of Virginia at the gubernatorial mansion on Tuesday evening, a steamboat excursion down the James river on Wednesday, visiting the seven United States monitors, the historical Drewry's Bluff and Dutch Gap, carriage rides and visits to various points of interest in Richmond on Thursday, including an inspection of the Tredegar Iron Works and the Richmond Locomotive Works, and a reception by the citizens of Richmond on Thursday evening. On Friday, 14th, the whole day was devoted to an excursion via the Chesapeake & Ohio Railroad to the yards of the Newport News Ship Building Company, thence by boat to the Portsmouth Navy Yard, where the United States battle ship "Texas" was inspected, and to Norfolk where several places of interest were visited.

We give below brief notes of the papers presented at the meeting, some of which we will print either in full or in abstract in the near future:

AUTHORITIES ON THE STEAM JACKET. FACTS AND CURRENT OPINION. By R. H. Thurston.

Great differences of opinion have been manifested in recent discussions as to the value of steam jackets, and Dr. Thurston has made a most interesting compilation, covering 40 pages, of figures and opinions, which, as he states, may be used as an introduction to a more formal discussion of the philosophy of the steam jacket. He believes that such discussion will probably largely reconcile the apparently conflicting opinions by exhibiting the fact that the jacket may, under different circumstances, prove a decided advantage, an unimportant appurtenance to the engine, or even, under exceptional conditions, deleterious to efficiency. A summary of results by various authorities shows that the gain by use of a steam jacket ranges all the way from zero up to over 30 per cent.

CHIMNEY DRAUGHT. FACTS AND THEORIES. By R. H. Thurston.

This paper is a discussion of the question whether there exists a temperature of maximum delivery of gas, as indicated by the theory of Péclet and Rankine. It gives the results of an investigation made under the directions of Dr. Thurston, with a chimney 20 inches in diameter and 32 feet in height, to determine whether there was any maximum in the vicinity of 600 degrees F., such as the commonly received theories give. The result in some cases showed an apparent maximum at about 700 degrees F., but in other cases showed no maximum within the range of temperatures observed, or up to 1,000 degrees F. The paper criticises the form of Rankine's formula, and frames a new theory which indicates that the temperature of maximum draught will be rarely found at less than 700 or 800 degrees, or very probably 1,000 degrees F. The author admits, however, that the conditions involved are so numerous and so variable that it is doubtful if any analysis can be made which will be sufficiently simple, convenient or accurate to come into general use in the solution of the problem, and that current successful practice rather than theory must continue to be our guide in the design of chimneys.

LIGHT CABLE ROAD CONSTRUCTION. By Frank Van Vleck.

Advocates of electric traction have asserted that cable roads can not be built as a single track system, but the author states that such roads are in operation in the far West, and gives the details of the construction of a single track road in San Diego, Cal. The road in that city was first operated as an electric road for about a year, when deficiencies of construction, improper design, inability to ascend grades, and large leakages of electricity and consequent loss of power compelled the company to cease operation. The franchise and equipment were then purchased by a company which has introduced the single-track cable system, and has just put it into operation. The author admits that the day of usefulness for the cable road on a level has forever gone, and that the electric road stands champion of the field; but there are some things the electric road as at present constructed cannot do, and for which the cable road is especially adapted, such as ascending steep grades. The paper contains descriptions and illustrations of the details used in the San Diego road, such as yokes, sheaves, grips, winding drums, etc.

HYDRAULIC TRAVELING CRANES. By Erwin Graves.

The author describes and illustrates a new form of foundry traveling crane, in which all the motions are obtained by hydraulic pressure. Two vertical cylinders, one at each end of the foundry, cause the motion of the bridge along the rails, two others horizontally placed at the level of the bridge and at one end of the foundry move the trolley upon the bridge, and a single vertical cylinder raises and lowers the fall block. All the operations are controlled by hydraulic valves located in a convenient "pulpit," as in the cranes and other hydraulic machinery used in steel works. Two such cranes, each of 15,000 pounds' capacity, have been in constant use over two years, giving entire satisfaction, the only repairs needed being the renewal of the packing of the rams. One man operates both cranes, and there never has been a man injured or mishap of any kind resulting from their use.

AUTOMATIC REGULATION OF INJECTION WATER TO VAPOR CONDENSERS. By James McBride.

In the operation of concentrating liquors in vacuum pans, as in the manufacture of sugar, the quantity of steam used is often variable; and the quantity of liquor fed to the pans also varies, the proportions of the two constantly changing. In such cases sometimes too little and sometimes too much water is used in the condensers, and the pan man, to be on the safe side, is apt to use more water than is necessary, thus increasing the cost of manufacture by needless waste of water. The paper describes an automatic device for controling the quantity of injection water, which consists of a mercurial thermostat, which opens or closes the injection valve, and which is operated by a rise or fall in the temperature of the water discharged. In practice it has been found to keep the temperature of the hot well constant within 2 degrees F., and it also shuts off the supply of water when steam is shut off. No difficulty has been found in carrying a vacuum of 26 inches with a hot well temperature of 120 degrees.

A NOVEL FORM OF FLEXIBLE TUBING. By T. R. Almond.

This paper describes the realization of the "wild idea" of a metallic tube, which is quite flexible, and yet which will convey gases, steam or liquids under considerable pressure. It is made by coiling a round wire around a mandrel, and then interposing a triangular shaped wire between the coils of round wire. The triangular wire is pressed between the coils of round wire with sufficient force to spread them apart, so that the contact surfaces are at all times under pressure. When the tube so constructed is bent the convolutions of the triangular coil adjust themselves to the spaces between the round wire, the two coils remaining in contact under pressure and gas-tight. Tubes have been made on this plan up to $\frac{5}{16}$ inch diameter.

AN INTERESTING EXPERIMENT WITH A LUBRICANT. By G. W. Bissell.

The experiment referred to was undertaken for the purpose of determining the variation of the co-efficient of friction of a lubricant, the rate of feed of the same to the journal being varied and all other conditions constant. The temperature was maintained constant by circulation of water through the brasses of the Thurston railroad-lubricant testing machine, which was used in the experiments. Tests were made with loads of 2,000, 3,000 and 4,000 pounds on the journal, corresponding to about 70, 105 and 140 pounds per square inch. The results indicate that with low rates of feed the effect of pressure on the co-efficient of friction is practically *nil*, which would tend to prove that under such conditions lubricated rubbing surfaces follow the laws of solid or "immediate" friction; but at the rate at which this state of affairs begins to be apparent the augmentation of the co-efficient is dangerous to the continuance of the smooth running of the journal. It is unsafe to reduce the rate of feed below .003 c. c. per square inch of projected area of journal per minute.

HEAT TRANSMISSION THROUGH CAST IRON PLATES PICKLED IN NITRIC ACID. By R. C. Carpenter.

Experiments were made to ascertain the relative heat transmission through cast iron plates in the condition in which they leave the foundry as compared with the same plates treated with dilute nitric acid for periods respectively of 9, 18 and 40 days. The results show a marked change in the conducting power of the plates due to a prolonged treatment with dilute nitric acid, and, the author concludes, would indicate that a beneficial effect might be expected by treating the castings of steam engine cylinders in such a bath. The action of the acid by dissolving the iron and not attacking the carbon forms a protecting surface to the iron, which is largely composed of carbon. The following figures show the relative transmission of heat through plates pickled in a 1 per cent. nitric acid solution and in a 5 per cent. solution respectively, as compared with an untreated plate, with the skin on, but free from rust, taken as 100:

Length of treatment.	9 days.	18 days.	40 days.
Relative heat transmitted through plates pickled in 1% solution.	86·3	70·7	63·7
Relative heat transmitted through plates pickled in 5% "	76·8	70·0	68·5

ROPE DRIVING. By Chas. W. Hunt.

This paper describes some of the limitations of the method of conveying power by cotton or manila ropes, which will enable the engineer to decide upon the relative advantage or disadvantage of any proposed speed. The author discusses the horse power, wear of rope, first cost of rope, and catenary, as the principal questions involved, giving formula and diagrams for each. We will publish this paper in full at an early date.

ACCIDENT-PREVENTING DEVICES APPLIED TO MACHINES. By John H. Cooper.

The following is an extract: "Loss of life or limb to an operative very often means the loss of a skilled "hand" to an important industry, as well as the loss to a family of its chief means of support. It may add to the burden of public institutions, and may lessen the productive power of our mills. Therefore, the prevention of accidents in a humanitarian sense, as well as in a commercial one, should be a matter of deep interest to us, demanding the exercise of ingenuity in the devising of effective means for securing this end. The subject is a broad one, and this paper proposes to merely touch it at a few salient points, and there leave it to the humanely wise, to whom a hint is sufficient."

The paper contains a number of hints, and some descriptions of accident-preventing appliances, such as safety valves, independently driven feed-pumps, "breaking pieces," instantaneously acting stop motions for looms, relief valves for cylinders, safety pinions, guards and guides for punching presses, duplication of steam valve disks to prevent engines from "running away" when the governor belt breaks; netting for mine cages, belt rests and carriers, guards to sheaves, etc. The use of strictly enforced rules and regulations is also touched upon. The paper is very good as far as it goes, but it does not go far enough. The subject is one which can scarcely be properly presented in a brief paper before a technical society; it ought to form the burden of a report of a committee, and a large book might be written upon it. We throw out this "hint" for Mr. Cooper's benefit.

NEW PROCESS FOR CUTTING TEETH OF SPUR WHEELS. By Ambrose Swasey.

In the new process, which is the subject of this paper, instead of making all gears so that they will run into a rack, the rack is transformed into a cutting tool, and by it the teeth of wheels of any diameter are generated and cut at the same time. The author has designed a remarkably ingenious gear generating and cutting engine for the purpose of reducing to practice the principles of the process. The cutting tool, which takes the place of the rack, is composed of a series of cutters rigidly connected, which revolve, and at the same time move longitudinally or endwise in line of their common axis, and at right angles to the axis of the wheel to be cut, and at the same speed as it is continually revolving at the pitch

line, the motions being the same as in the case of a rack engaging with a revolving gear.

A SINGLE-ACTING COMPOUND ENGINE. By William A. Bole.

The engine described and illustrated in this paper is of the type so well known in the Westinghouse compound engine. The cranks are at 180 degrees, and there is no receiver space between the high and low-pressure cylinders. A single piston valve working across the top of the cylinders distributes the steam to both. A shifting eccentric is used, giving a variable compression in both cylinders. The compression in the high-pressure cylinder is brought up to the initial pressure, and neither above nor below it, by properly proportioning the clearance volume of the high-pressure cylinder and the relative displacement of both pistons. It is claimed that the engine improves in tightness with use, a test of a new engine, 12 inches × 20 inches × 12 inches, showing a water consumption of 25·42 pounds of water per indicated horse power per hour, but after six months' service it showed a consumption of only 22·35 pounds.

HYDRAULIC HOISTING PLANT FOR PIER OF BROOKLYN SUGAR REFINING COMPANY. By Louis G. Engel.

The work to be done was the unloading of packages weighing from 1,200 pounds to 2,600 pounds from vessels alongside of the pier, including the drag along the intermediate decks to the hatches, and the transfer of part of the packages to the second floor of the pier for storage. The disadvantages of separate steam engines and of shafting and friction drums for the purpose are discussed, and balanced against the disadvantages of a hydraulic system, which are danger of freezing and first cost. The first of these is expected to be overcome by a non-freezing mixture, and the second to be offset by economy of operation. The plant consists of a Worthington duplex pump, $20\frac{1}{2} \times 4\frac{1}{2} \times 15$, for 800 pounds water pressure and 800 gallons per minute; a Rumsey rotary drip pump, two accumulators, 10 inches diameter, by eight feet stroke, loaded with 30,000 pounds of pig iron contained in a wrought-iron tub; high-pressure pipes, 5, 4 and 3 inches diameter, tested to 2,500 pounds per square inch; tanks for suction and drip, four whip hoists for unloading and two platform elevators. All of these are described and illustrated in detail. The plant, except the pumps, was constructed by Otis Bros. & Co., of New York. The design of the details is due to Randolph C. Smith, and follows as nearly as possible the requirements of the London water-works system.

EXPERIMENTAL DETERMINATION OF THE LATENT HEAT OF AMMONIA AND SULPHUR DIOXIDE. By D. S. Jacobus, Hoboken, N. J..

These two fluids are at present the most generally used for the production of artificial cold. The author presents results of experiments to determine their latent heat, together with the description of an apparatus which has been constructed at the Stevens Institute for such experiments. The paper reviews the work of Regnault and other experimenters in the same direction, and gives several tables of comparison of results found by experiment and theoretical calculations.

MECHANICAL AND PHYSICAL PROPERTIES OF SULPHUR DIOXIDE (SO_2). By De Volson Wood.

In the paper of Prof. Jacobus, as above noted, experimental values of the latent heat of sulphur dioxide are given. In Prof. Wood's paper, however, the statement is made that the experimental value of the latent heat of vaporization is not known, nor the specific heat of the liquid. This apparent difference will no doubt be eliminated when the papers are finally revised after discussion. Prof. Wood has deduced some formulas for determining the values of these constants, and from them he has calculated a table of the properties of SO_2 at various temperatures from 20 degrees to + 140 degrees Fahr. His figures for latent heat are about one and a half per cent. less than those obtained by Ledoux, who used other formulæ, and he considers that this close agreement will inspire confidence in the figures, although they probably never will take the place of experimental values.

SOME PROPERTIES OF AMMONIA, By De Volson Wood. (Second paper.)

This is a very brief paper making a few corrections in the formulas given in an earlier paper on the same subject, and giving some additional calculations.

THEORETICAL INVESTIGATION OF THE EFFICIENCY OF VAPOR ENGINES. By De Volson Wood.

Prof. Wood, having discovered certain defects in the investigation made by Messrs. Gantt and Maury in 1884 on the efficiency of engines, has had their work reviewed by two of his students—Messrs. J. T. Westcott and L. R. Mendoza (Stevens, 1890). The fluids considered are steam, alcohol, carbon disulphide, chloroform, ether and ammonia. The first case considered is that in which the fluids are worked in a Carnot's cycle, between the temperatures of 341·6 degrees F. and 194 degrees F., and numerical solutions show that the efficiency is precisely the same, viz: 18·4 per cent. for all six of the vapors.

In the second case a step is taken toward the conditions of actual practice (the Carnot cycle being purely hypothetical) by assuming that the cylinder communicates with a condenser, that the exhaust is not opened until the end of the stroke, and that it remains open during the back stroke, there being no compression. The initial temperature is assumed to be 341·6 degrees Fahr. as before, and the temperature of the condenser 104 degrees Fahr. The numerical solution gives the following efficiencies for the six vapors: H_2O, 20·64; C_2H_6O, 21·94; CS_2, 20·14; $CHCl_3$, 19·40; NH_3, 18·79; $C_4H_{10}O$, 15·5 per cent.

In the third case all the fluids are assumed to be expanded between certain limits of pressure, viz, 121·6 and 10·2 pounds per square inch, the temperature of the condenser being assumed as 104 degrees as before, but the result for ammonia in this case being unpractical as the pressure in the condenser would be greater than that in the boiler, an additional calculation is made for this fluid in which the inferior limit of pressure is 72 pounds per square inch, corresponding to a temperature of 39·34 degrees F. The results of the calculations give the efficiencies as follows:

H_2O, 20·64; C_2H_6O, 18·38; CS_2, 19·27; $CHCl_3$, 20.13; NH_3, 2·87; $C_4H_{10}O$, 12·84.

These efficiencies would be modified by the effect of condensation and also by compression to fill the clearance spaces in actual engines, but Professor Wood concludes that considering the size of the engine (that required for steam being the smallest) the cost of construction, the cost of the fluid, and the facility and safety in handling it, water is by far the best medium of the substances considered for transforming heat into power.

PERFORMANCE OF 75 TON REFRIGERATING MACHINE OF THE AMMONIA COMPRESSION TYPE. By James E. Denton.

This is a very elaborate paper of 79 pages, profusely illustrated with indicator and plotted diagrams, views of machinery, etc. It describes what is probably the most complete investigation of an ammonia refrigerating machine ever made. The tests recorded are eight in number, of from 11½ to 24 hours each, under conditions varied so as to obtain maximum efficiency and to determine the influence of various changes of conditions. We shall shortly publish an abstract of this most valuable paper.

AGERSKOV'S ADMONITOR.

Mr. Agerskov, of Copenhagen, Denmark, has invented a thermo-alarm apparatus, called admonitor, which seems to be an important device for averting danger as well as for saving in repairs by reducing indirectly the wear which increases with the temperature of the surfaces in friction. It is cheap, universally applicable and has so far proved effective.

Den tekniske Forenings Tidsskrift, October, 1890, describes this invention as consisting of a copper cylinder in the shape and size of a pistol cartridge. It is closed at one end and at the other is fitted with a rubber stopper. It is filled with a slowly burning matter of high illuminating power and on top of that a mixture of two parts of chlorate of potash and one part of sugar, in which mixture is deposited a drop of concentrated sulphuric acid inclosed in a film of paraffine, the almost entire insolubility of paraffine in sulphuric acid securing permanence to the ball.

At about 75 degrees C. (135 degrees F.) the paraffine melts. The sulphuric acid is then brought in contact with the surrounding mixture, which it ignites, and thus gives the danger signal, the cork being forced out by the ignition. By a slight modification the device is made an alarm sounder also, and by another arrangement the flame melts an easily fusible metal disk, and thereby liberates a spring which closes an electric current, so that the information of an excess of 75 degrees C. for any number of bearings provided with a cartridge and connected with the signal station can be tabulated on one single board.

The manner in which Mr. Agerskov manufactures these balls is so ingenious as to be of general interest. Steam circulates through a spiral tube inserted in the upper part of a glass jar, whose lower part is filled with water; the steam keeps in a molten condition a layer of paraffine which floats on the water, its sp. gr. being 0·86. A cooling mixture, surrounding the water-filled portion of the jar, keeps the temperature of the water low. Above the glass is suspended a dropping apparatus consisting of a funnel-shaped glass tube which contains sulphuric acid and is surrounded by a cooling mixture in another vessel. A syphon is placed in the sulphuric acid in such a manner that one of its branches issues from the pointed end of the funnel-shaped tube. By manipulation of a stop-cock in the syphon, a drop of the cooled sulphuric acid falls into the jar, where a film of paraffine forms around it, and owing to the specific gravity of sulphuric acid, 1·8, the paraffine-enveloped drop sinks through the top layer of paraffine to the bottom of the water. All the little balls thus necessarily contain sulphuric acid.

"CHINA'S MENACE TO THE WORLD."

Under the above caption the *Industrial World* published recently a long dissertation proving that the Chinese have no right to enlarge their civilization because it will endanger the commercial supremacy of other nations. "How expansive this growth of strength, internal and external, is becoming," it says, "may be judged by the report recently made as follows by the United States Minister to China, communicating with the State Department at Washington. I have the honor to inclose an imperial decree, commenting on the late proposal of the viceroy of Canton to develop the important iron industry in Tokuang. In order to foster this important industry, he has abolished inland duties on iron and the prohibition against its export. He proposes to investigate by commission the subject of abolishing the heavy duty now levied on furnaces. Such a plan put into force for three years could not involve a large diminution of the revenue, but would greatly benefit the iron-producers by doing away with illegal fees. He proposes also to create a joint stock company to work the foundries with foreign machinery. It would seem that the mind of this distinguished man, Chang Chi Yung, had undergone a change. He now, while still materially seeking to retain for his own people the benefits of industrial enterprise, favors the extensive use of foreign methods in building railroads and in establishing electric lights and foundries.'"

Then our contemporary cries out in fear that the term "Chinese cheap labor" may have a positive significance of an aggressive kind when the Mongolians emerge from their present crude state, "for, in countries where the capacity to resist encroachment shall be weak, the arrogant intrusion of products forced upon unwilling consumers by the unsparing greed of a heathen people might involve the overthrow of existing industrial conditions." All of which, liberally interpreted, means that a veritable Chinese wall must be erected around Caucasian nations to exclude Chinese manufactures and products. But it entirely omits to entertain the idea that Chinese advance is not the matter of a year, but of decades, and that during its commercial and industrial advance America and other favored nations will expect to supply the "heathens" (of whose progress they are in mortal fear) with their machinery, material and manufactures.

If the Chinese, in their laudable ambition to occupy a leading position among the nations of the world, should follow a Caucasian practice, and prohibit the importation of our manufactures, that would take all the poetry out of the situation. The Protectionist, or *ad captandum* argument, is a two-edged sword. If China advances to a position where she can compete with us now, is there no prospect that this and other nations may improve in the same ratio? If our contemporaries who bemoan Chinese progress will remember that there is always room at the top, they may be happy yet.

EXPERIMENTS IN ZINC DESILVERIZATION.

By H. Rossler and B. Edelmann.*

The experiments here described emanate from the generally recognized fact that the desilverization of lead by means of zinc, though based on a principle so simple that its easy operation might be expected, is, practically speaking and in spite of all the improvements that have been introduced within the last decade, still a very imperfect process. As a case in point, the direct yield of lead is generally still highly insufficient, and the by-products can only be re-worked with difficulty, and in a roundabout manner; in fact, a great part of them must not only pass again through the blast furnace, but it must also be subjected once more to the whole desilverizing treatment, in the course of which material losses in lead and silver become unavoidable. Besides, the recovery of the zinc is, by all of the different methods, still quite costly and imperfect.

The object of the experiments here described was to increase the direct yield of the lead and to improve the method of recovering the zinc. Regarding the former point, it is worth noticing that the very first publication about the desilverization, made in 1852, suggested a great deal of what afterwards was discovered by experience, and it seems to forecast improvements yet to be made. Above all it appears clearly from that publication that the original aim was to effect, already during the desilverization, the separation of a pure alloy of zinc and silver from the desilverized lead, whereas our present mode of working still compels us to skim off a so-called zinc scum, which consists of a mixture of particles of zinc-silver alloy of varying composition, together with a very considerable portion of the lead, and with more or less of metallic oxides.

The formation of these oxides at the high temperature obtaining, and on account of the long duration of the process, cannot be avoided, and these are the main cause of the difficulty in separation, and of the formation of the zinc scum, which, once formed, facilitates the progress of oxidation, owing to its spongy and porous consistency. As the limited use of zinc is necessitated by its costliness, the zinc-silver is rich in silver, and is, therefore, a heavy semi-fluid. It is surrounded with a film of oxides, and forms zinc scum with adhering lead, which cannot be separated from it, and it thus causes the small direct yield of lead, and the expensive necessary subsequent treatment.

Even if by the usual method of desilverization no oxidation took place, and a higher temperature were used in order to segregate the zinc-silver alloy, the result would be that at so high a temperature all the zinc and all the silver would remain in the lead. The first series of the following experiments is intended to show how far it is possible to obviate the formation of the scum and obtain the pure alloy of zinc and silver. These experiments were conducted with careful observation of the smelting temperatures, and the greatest effort to reduce the oxidation, and were made first in glass tubes and porcelain crucibles over the open gas flame, then in the melting crucibles in gas furnaces, and finally, on a larger scale, in iron pots.

When the molten zinc is stirred into the molten lead the latter absorbs a certain per cent. of the zinc (more as the temperature is higher), while the remainder at once rises to the surface, owing to its smaller specific weight, and especially if the layer of oxidation is removed by sprinkling with sal ammoniac, the rising matter can be seen floating on the surface. At 400 degrees C., the heat of smelting zinc, the lead retains from 0·6 to 0·8 per cent. of zinc; at 500 degrees from 0·9 to 1·3 per cent.; at 600 degrees, the heat of smelting aluminum, from 1·5 to 2·3 per cent.; at 700 degrees more than 3·0 per cent.

When lead saturated at about 700 degrees is allowed to cool slowly, the excess of zinc gradually separates and, being lighter, rises to the surface, and the unavoidable oxidation gives its mixture with lead the appearance of a scum, which only by application of sal ammoniac and, if necessary, by re-heating, collects into a zinc disk, which, when cooled from above, can be lifted off. This can be repeated several times until the lead gradually reaches about 400 degrees, where it still contains 0·6 per cent. of zinc, which it cannot give off.

The zinc thus added to the lead does not emerge entirely free from lead, but this increases with the temperature at which the mixing is made. At about 400 degrees zinc can hold about 1·7 per cent. of lead in solution, at 500 degrees 2·3 per cent., at 600 degrees 3·5 per cent., at 700 degrees 5·6 per cent.

If to lead at a little over 400 degrees C., and containing silver (in this as in the following series of experiments 150 grams of silver per 100 kilograms), molten zinc is added in quantity equal to 10 per cent. of the weight of the mass, from 9 to 9 4 per cent. of the zinc will rise to the surface together with most of the silver, and can be removed as a zinc disk, while from 0·6 to 1 per cent. of zinc with a small part of the silver (in our experiments nearly 7 grams) remains in the lead; the proportion of zinc to silver in the alloy was about as 60 to 1.

4. If the 10 per cent. of zinc is mixed in three portions, say first 5 per cent. at about 600 degrees, then 3 per cent. at 500 degrees, and last 2 per cent. at about 450 degrees, with the gradually cooling lead, three zinc disks appear in succession, containing of zinc and silver respectively 3·0 per cent. and 120 grams., 3·6 per cent. and 22 grams., and 2·3 per cent. and 5 grams. Our experiments gave afterward about 0·5 per cent. of zinc as a non-oxidized scum, and the lead retained only 0·6 per cent. zinc and a fraction of a gram of silver. After the first skimming, the proportion of zinc left in the lead was 2 per cent., after the second about 1·4 per cent., after the third about 1·1 per cent. The proportion of zinc and silver was in the three instances 25 to 1, 140 to 1, and 460 to 1.

The desilverization is here more perfect than in the third series of experiments, where the whole quantity was added in a lump. This advantage as well as the rapidity of the process, which requires no intermediate cooling, is, however, more than counterbalanced by the great quantity of zinc required, which renders this method far too expensive.

5. In this experiment we added to 100 parts of silver-bearing lead only enough zinc to keep the lead dissolved at the temperature under which it was worked; for instance, 2·6 parts of zinc at between 600 and 700 degrees. No silver-bearing zinc rises to the surface at the commencement, but when cooled down to between 500 and 600 degrees it gradually separates as a scum mixed with lead and oxide, not as in experiments 3 and 4. It does not take the shape of a zinc disk, for if the scum is decomposed by reheating, and the zinc, rendered pasty by its high content of silver, is melted, all the zinc, and consequently all the silver also, would re-dissolve in the lead. Morecver, the oxide would hinder the melting and a further oxidation would take place.

The scum skimmed from the surface at say 500, 450 and 400 degrees gives, as the proportion of zinc and silver, 7 : 1, 33 : 1, and 120 : 1. The lead still contains 8 grams silver and 0·6 per cent. zinc.

6. The following series of experiments was intended to illustrate work on a large scale: At about 500 degrees C. 1·2 per cent. of zinc or eight times the quantity of silver is added to lead, carrying 150 grams silver per 100 kilograms, and the mixture, carefully stirred, is allowed to cool down to, say, 400 degrees, then about half the zinc, or 0·6 per cent., remains in the lead, while the other 0·6 per cent, together with the silver goes into the scum, the proportion of zinc to silver in this being 4 : 1. The formation of zinc disks is here out of the question, because, in the first place, all the zinc is absorbed by the lead in the beginning of the process and only the excess of zinc, which is insoluble, forms the disks and, secondly, because the alloy of 80 per cent. zinc and 20 per cent. silver melts only at about 600 degrees, but the particles of the alloy in solid form and more or less oxidized, rise gradually when the temperature decreases to 500 degrees and less; these particles unite with particles of lead and form the zinc scum. This scum contains, here also, more silver in proportion to zinc in the beginning than afterward, but the difference is not so great as in the previous case. As the stirring must be kept up for a long time, and the collecting on the surface also is slow, the oxidation is considerable; by working on a large scale it was found to reach 2 per cent. of oxide.

7. Another example was the liquation (saigern) of the zinc scum where the highest temperature, namely cherry red heat, was used. The liquated lead contained before skimming 3·0 per cent. of zinc and 0·775 silver or 4·0:1, after skimming 1·36 per cent. and 0·300 or 4·5 : 1, at the edge, when beginning to form, 1·12 per cent. and 0·150 or 7·4 : 1 and in the finished liquated lead 0·72 per cent. and 0·004 or 180 : 1.

The proportion between zinc and silver was in all the samples almost uniform, or about 3½ to 1, while there was a decrease in the lead, but this decrease was slower than in the preceding experiments, the proportion of zinc and silver being here only 4 to 1, while it was 8 to 1 in the desilverization on a large scale, and in the previous experiments still more zinc was employed.

8. Four parts of zinc were mixed with 100 parts of lead, containing 0·75 parts of silver, and the mass was allowed to thicken; or 1·2 parts of zinc were added to 100 parts of silver-bearing lead at a low temperature The result in both cases was a kind of artificial zinc scum very slightly oxidized. Attempts to separate pieces of this alloy into lead and zinc-silver lead by continued heating led to the liquation of a part of the lead; it is, however, accompanied by strong oxidation; as the alloy to be melted requires a heat of more than 600 degrees. The greater the heat, the greater the oxidation, and a complete separation into two layers is no longer possible. But when the above mixture is added piece by piece to a molten slag, composed of equal parts of chloride of potassium and chloride of sodium and the heat is kept for some time above 600 degrees, the slag absorbs the film of oxide already formed. A further oxidization is stopped, and on top of the lead floats the sharply separated alloy of zinc and silver, which, in this experiment, contains 3½ parts of zinc and 1 part of silver, while 1·5 per cent. of zinc and perhaps 20 grams silver per 100 kilograms remained in the lead.

9. The same experiment made with scum of approximately the same composition from an industrial establishment gave a negative result. The oxidation in the mass was too great to allow any separation in two sharply defined layers. Only liquated lead was obtained, and on top of this a rich zinc scum, the slag being thick and pasty from absorption of oxides. Less unsuccessful was the experiment when more zinc or alloy of zinc and silver was added; 100 parts of highly oxidized zinc scum were put into melted saltslag containing 20 parts of a zinc-silver alloy, consisting of 4 parts of zinc to 1 part of silver. A very high temperature was necessary, and the layer of zinc-silver contained 23 per cent. of silver, but the lead underneath had again absorbed more than 3 per cent. of zinc and almost the fourth part of all the silver, and the slag had aborbed so much of the oxide as to make it a thick pasty mass inclosing numerous metallic particles.

This shows that here the distinct separation of an alloy consisting mainly of zinc and silver, from the zinc scum is only prevented by its oxidation, and that if the oxidation could be entirely obviated, it would be possible by subsequent liquation to obtain what, under the usual conditions of desilverization, is beyond reach.

10. In this experiment 2·6 parts of an alloy of 95 per cent. zinc and 5 per cent. silver were mixed with pure lead in order to ascertain how much the latter retains of the zinc and of the silver. At nearly 600 degrees almost no silver but the greater part of the zinc had been absorbed by the lead; the alloy which floated on top after the mixing could not be made to form disks and contained only 0·6 parts of zinc; the proportion of silver and zinc was 1 : 4⅓. At a lower temperature, say 500 degrees, the alloy containing 1·3 parts of zinc, silver and zinc being in the proportion of 1 to 10, could be removed as disks, thus an alloy of zinc and silver, richer in silver and less easily melted, can be obtained from one poor in silver and easy to melt. Numerous experiments have proven that the melting point of a 20 per cent. alloy is at about 600 degrees and that of a 10 per cent. alloy at 500 degrees, whilst the melting point of a 5 per cent. alloy is scarcely higher than that of pure zinc.

11. The observations made at these experiments demonstrate that all of the zinc in excess of that required for the saturation at the respective temperatures of the silver-bearing lead immediately rises to the surface and can be skimmed off with the greater part of the silver, which was contained in it, and secondly that rapidity of work can prevent further oxidation, and lastly, that an alloy of silver and zinc, poor in silver, when mixed with lead at a high temperature, gives off zinc and thus becomes richer in silver.

Zinc in successive increasing quantities was so rapidly worked through lead which at the start was heated to about 600 degrees that only a slight oxidation took place. Every part of the zinc was put four times in the lead, three times in silver-lead which already was partly desilverized and

*In *Berg-und Hüttenmännische Zeitung*, p. 245, 1890.

saturated with zinc, and finally into fresh silver-lead, becoming gradually so enriched in silver (whilst finally leaving a great deal of the zinc) that the proportion of zinc to silver was 4 to 1 as in the previous zinc scum. Every part of the added zinc rises at once to the surface and can be removed after being cooled by sprinkling with water. Each addition of zinc makes the lead poorer in silver. The zinc-silver alloy melts more easily and at the same time the temperature decreases gradually from 600 degrees to about 400 degrees.

The following table shows how 100 parts of lead with 150 grams of silver *should* work:

On adding	2·6	p'ts	zinc	with	130	gr.	sil.,	0·6	part	zinc	and	150	gr.	sil.	could be removed.
"	"	2·1	"	"	"	21	"	"	2·6	"	"	"	130	"	"	"	"	"
"	"	1·6	"	"	"	3	"	"	2·1	"	"	"	21	"	"	"	"	"
"	"	1·1	"	fresh	zinc				1·6	"	"	"	3	"	"	"	"	"

The proportion of zinc to silver would in the four cases be, respectively, 4 : 1, 20 : 1, 100 : 1, 500 : 1. The first skimmings should be ready for treatment by distillation or electrolysis, the second should be applicable as first addition, the third and fourth as second and third addition in the subsequent operations, and the remaining lead should be entirely desilverized and only retain slightly more than 0·6 per cent. of zinc. This ideal expectation was approximately realized by the experiment in which were added to 100 parts of lead with 150 grams silver

2·6 parts of zinc with 130 gr. of silver and skimmed-off removed 0·6 parts of zinc, with 216 gr. of silver.
2·1 parts of zinc with 21 gr. of silver and skimmed-off removed 2·4 parts of zinc, with 53 gr. of silver.
1·6 parts of zinc with 3 gr. of silver and skimmed-off removed 1·8 parts of zinc, with 19 gr. of silver.
1·1 parts of zinc with — gr. of silver and skimmed-off removed 1·5 parts of zinc, with 216 gr. of silver.

After the last skimming a scum-like but not oxidized mass of alloy, containing 0·5 parts of zinc and 3 grams of silver, still rose to the surface, and the lead retained finally only 0·6 per cent. zinc and 1 gram silver; the proportion of zinc to silver in the four skimmings was 3 : 1, 15 : 1, 94:1, 150 : 1. The first skimming, rich in silver, consisted of a crumbling mass, while in all the subsequent skimmings the melted silver-bearing zinc was rather smooth on the surface, and could be removed after cooling, as a caked mass or disk, although some lead still adhered to it.

The following experiments were made with the object of more fully recovering the zinc. They were first made in a clay crucible containing several hundred grams, and afterwards in small iron pans with 200 kilograms of lead.

1. To separate the zinc from the lead carbonic acid was used instead of steam, for it oxidizes only zinc, not lead. It was introduced into lead containing about 3 per cent. zinc at about 700 degrees C., the highest temperature that can be used with iron pans. After a short time all the zinc was expelled as a white oxide, leaving the lead smooth, glassy and free from zinc.

2. In experiments on a larger scale a mixture of carbonic acid and nitrogen was produced by pressing air through a cylinder filled with glowing coal. The mixture was forced through red-hot zinc containing lead, whereby a gray dust was obtained which probably partly consisted of metallic zinc. The gases had volatilized the zinc even below its boiling point, just as ether or alcohol can be forced out of water containing either of them by a blast of air at a quite low temperature.

3. Here a mixture of carbonic oxide and nitrogen, produced by letting the air pass through a larger mass of glowing coke, was forced into the lead. The gray fumes became now darker and deposited quicker. It contained more metal (up to 75 per cent.) than before and was never altogether free from oxide, for we could not obtain gases free from carbonic acid or oxygen. When the temperature rose above 700 degrees (as high as feasible with cast iron pans), the process met with no difficulty whatever, particularly when the gases were pre-heated and, by means of a special arrangement, thoroughly distributed. All the zinc was driven out and blown off; the lead was smooth, brilliant and not crusty. But whenever the heat decreased too much, crusts of zinc formed on the surface which could not be removed; the lead was free from zinc, but a part of it had gone into a by-product. When the temperature is not quite high enough the zinc appears still to rise from below, but cannot be altogether separated from the lead.

4. In the following experiments we wished to ascertain if at the highest temperature possible with iron pans the zinc cannot be driven out of the lead, and also take a compact form, so that it could be used over again for desilverizing purposes. Hydrogen was forced into a tightly closed clay crucible with an iron cover, in which a rather long tube was inserted; the zinc-bearing lead was melted in this crucible at about 700 degrees. If the gas is not let in too rapidly and the cover is kept moderately cool, a metallic crust deposits on the cover; otherwise the zinc is here also driven out of the crucible as a gray powder.

A great difficulty which had to be contended with in all their experiments was that the zinc driven out partly falls back again into the metal bath and thus retards the process. For this reason a very strong current of gas is recommended, strong enough to carry everything with it. Should it become feasible to drive the zinc out of the lead by means of carbonic acid or indifferent gases and, on a large scale, in iron pots, this device would be applicable for recovering zinc by either method.

NEW BALANCES FOR THE UNITED STATES ASSAY OFFICE.

The United States Government last spring contracted with the noted scale maker, Henry Troemner, for an unusually fine balance for use at the United States Assay Office, New York, which has recently been finished and placed in position. It is made to carry 10,000 ounces in each pan (about 700 pounds avoirdupois). The contract specified that the balance must turn with $\frac{1}{100}$ ounce when loaded to its full capacity. The beam and its hangings, together with its full load, will weigh almost a ton weight. To put this in motion with less than 5 grains will indicate at once to what perfection all the working parts must be brought. When the balance was placed in position, a careful test was made by the superintendent of the assay office, and the balance loaded with 10,000 ounces of gold bricks. The addition of the extra $\frac{1}{100}$ ounce immediately started the whole mass in motion and demonstrated that the remarkable sensibility had been secured.

DE BEERS CONSOLIDATED DIAMOND MINES, SOUTH AFRICA.

From the annual report of De Beers Consolidated Mines for the year ending March 31st, 1890, which has been sent us through the courtesy of their superintendent, Mr. Gardner F. Williams, we make the following abstract:

The company includes the four diamond producing mines: De Beers, Kimberley (which was described and illustrated in ENGINEERING AND MINING JOURNAL of November 13th, 1886), Du Toits Pan and Bultfontein. The company shows a balance of £465,416 after payment of a 10 per cent. dividend or £789,682. During the year 1,951,100 loads of "Blue" have been washed, yielding 1,608,830 carats of diamonds or £2,642,557, the working expenses amounting to £1,431,777.

The cost of mining (in the De Beers mine) averaged 5s. ½d. per load, the cost of working 8s. 5½d. per load, which is 1s. 5d. less than in the previous year.

The mines are evidently the result of the filling of extinct craters with volcanic mud from below. The shales which surround the "blue" or diamond-bearing ground were turned upward, showing that the force was from below; the boulders found in the blue are of the same composition as the rocks which surround the blue. The frequent occurrence of broken crystals imbedded in the blue is sufficient evidence that the diamonds are not in their original place of crystallization, or formed *in situ*.

The four mines discovered, about twenty years ago, were all worked as open quarries until about six years ago. Tunnels driven across the (De Beers) mine, east and west, about 120 feet apart, were connected by two tunnels running north and south. From the east and west tunnels, short offsets 10 feet long were driven every 36 feet, and the ends of these offsets ran into galleries 18 × 18 feet in cross section. The levels were 30 feet apart. There remained a roof of blue ground 12 feet thick and a pillar 18 feet thick on both sides. It was found in practice that the galleries were difficult to maintain and became unsafe for the workmen, so that a modification of the system has been introduced.

Hoisting is done from only one level at a time through the same shaft. All the ground lying between two main levels is dumped into shoots and passes down to the main level, where it is loaded into trucks and sent to the shaft, tipped into the skips and hoisted to the surface.

The tipping arrangement at the bottom consists of an iron shoot without a door. While the loaded skip is being hoisted four end-tipping trucks are placed in position, and the door-catches loosened. The four doors are held closed by two natives. Directly the skip is seen to pass the shoot, the trucks are tipped.

No. 2 incline shaft at De Beers has four compartments, one for a ladder way, one for the man trolley, and two for the skips. The skip ways are each five feet wide and four and a half feet high. The shaft is inclined 56 degrees 20 minutes from the horizontal. The skips run on steel rails (46½ pounds per yard). The back wheels of the skips which hold 64 cubic feet or four loads, weighing 1,600 pounds each, are about double the width of the front wheels. When the skips come into the pit head frame, the back wheels take a broader gauge track made of angle iron to keep them in place, while the front wheels pass within the frame and downward, and dump the ground automatically into the box. The gauge of the tracks in the incline is 3 feet 11 inches. At a point about 80 feet from the bottom the roads join, and the skips are filled alternately from the same shoot. The ground is hoisted from the 700-foot level. The amount of ground hoisted through this shaft from April 1st, 1889, to March 31st, 1890, was 1,355,089 loads, equal to 1,084,071 tons of 2,000 pounds.

The floors, in some instances several miles distant, are the leveled, rolled and hardened land on which the blue ground is deposited in a layer so thick that a load (about 1,600 pounds) covers about 21 square feet. Under the influence of heat of the sun and moisture, large pieces, as hard as ordinary sandstone when taken from the mine, soon commence to crumble. The ground is continually harrowed to assist pulverization by exposing the larger pieces to the action of the sun. Spans of mules for this purpose will soon be superseded by steam traction engines with gear for drawing the harrows. The time necessary for pulverization varies from three to six months during the summer.

The washing pans are 14 feet in diameter with 10 arms, which have each six or seven teeth, set in a spiral, so that, when the arms revolve, the teeth carry the heavy deposit to the outer rim of the pan while the lighter material gathers toward the center and is discharged from the pan. The blue ground, when decomposed, is raised to a proper level and dumped into a long shoot with perforated pipes laid across it, through which the flow of water regulates the downward movement of the blue into revolving cylinders, which are 2 feet 6 inches in diameter and covered with steel mesh. The ground, too coarse to pass through these meshes is re-deposited upon the floors. The fine ground flows into the pans at the outer rim and out near the center. The heavy deposit which contains the diamonds is drawn off from the bottom of the outer rim every 12 hours. At De Beers every two pans are discharged into a safety pan where, in a test of 100,000 loads of blue, the yield was one carat per 100 loads washed. From the safety pan the tailings pass into tanks and are hoisted and deposited in heaps.

The average quantity of blue ground passed through a pan is from 400 to 450 loads in 10 hours. The deposit remaining in each pan, amounting to three or four loads, is sent for further concentration to the screens. That portion of the deposit which is too coarse to pass through these is sorted at the end of the cylinder. The four sizes which pass through the screens flow upon jigs; these are made stationary, the bottoms being covered with screens, the meshes of which are ½ inch, $\frac{5}{16}$ inch, ¼ inch, $\frac{3}{16}$ inch *square*, which are a little coarser than the plates on the cylinder. Upon the screen a layer of leaden bullets is spread. These bullets prevent the deposit from passing through the screens too rapidly. The heavy deposit with the diamonds is drawn off and taken to the sorting tables. The following is the proportion of concentration. Out of 7,200 loads washed, 72 loads are sent to the screens. Of the 72 loads, 6 pass through the screens, 24 loads pass out of the end of the cylinder, and the remaining 42 loads flow over the jigs as waste. Out of every 240 loads of blue washed, one load or 16 cubic feet of gravel passes through the hands of the assorters. The assorting is done on tables, first, while wet, by white men, and then, when dry, by native convicts. The deposite is gone over as often

as diamonds can be found in sufficient quantity to repay the cost of convict labor.

The minerals which reach the sorting tables with the diamonds are 1, Pyrope (Garnet), having a specific gravity of 3·7 and containing from 1·4 to 3 per cent. of oxide of chrome; 2, Zircons (sp. gr. 4 to 4·7), flesh-colored grains and fragments, but no crystals; 3, Disthene (sp. gr. 3·45 to 3·7), discernible by its blue color and perfect cleavage; 4, Chrome Diopside (sp. gr. 3·23 to 3·5), in fragments, color bright green; 5, Enstatite (sp. gr. 3·1 to 3·3); 6, Mica; 7, Magnetite; 8, Non-magnetic Iron Ore, containing chrome and titanium in changeable quantities (that is to say, it is sometimes chrome iron and sometimes titanium iron ore), and according to analyses by Knop, from 13 to 61 per cent. of oxide of chrome and from 3 to 68 per cent. of titanic acid; 9, Hornblende; 10, Barytes.

The diamond occurs in all shades of color from deep yellow to blue white, from deep brown to light brown and in a great variety of colors, green, blue, pink, brown, yellow, orange, pure white, and opaque. It is the hardest of known substances and has a specific gravity of 3·53. The stones vary in size from that of a pin's head to 428½ carats in the rough (a carat weighs 3·17 Troy grains) This is the largest stone ever found in the four mines, measuring 1⅞ inches through the longest axis and 1½ inches square, and was exhibited at the Paris Exposition, 1889. It lost 200 carats in the process of cutting.

The diamonds are sent daily to the general office under an armed escort, and delivered to the valuators. The first operation is to clean the diamonds of any extraneous matter by boiling them in a mixture of nitric and sulphuric acids. When cleaned they are assorted with reference to size, color and purity. Parcels are then made up, and when valued are sold to local buyers, who represent the leading diamond merchants of Europe.

Four million eight hundred thousand loads of blue ground are in sight, equal to four years' work; but a projected main shaft is likely to open up a great deal more.

The total number of employés is 1,281 white and 5,280 natives. The average wages are at the mine, per week, for mechanics, £6 to £7; miners, from £5 to £6; guards and tallymen, from £4 to £5; engine drivers, £6; natives in the underground works from 4s. to 5s. a day.

In No. 2, Incline De Beers (upcast shaft), the temperature of the underground works varies from 70 to 73 degrees Fah. In the Rock Shaft (downcast) it is 54 degrees. The average yield of diamonds per load of blue is in Kimberley, the richest, from 1¼ to 1½ carats, and in Du Toits from ½ to ⅝ carat. The total production for 1889 was 2,755,205 carats, valued at £4,090,147, or an average per carat of 29s. 8⅝d. The total yield since 1882 is valued at £23,263,497.

NEW PUBLICATIONS

MANUAL OF INDUSTRIAL AND COMMERCIAL INTERCOURSE BETWEEN THE UNITED STATES AND SPANISH AMERICA. The Bancroft Company, San Francisco, Cal.

In the 630 pages of this work will be found every detail of information calculated to be of service to all in North and South and Central America interested in the international trade. The vast amount of matter, crowded together in small type, is equal to a library on the subject, and is edited up to date by Thomas Savage, who was for twenty years a representative of the United States in Spanish-American countries. In the preface it is claimed that the book is "essentially a buyers' and sellers' guide," but the manual has also a higher object in urging the freest, fullest and most profitable intercourse between the nations concerned—"nations almost unknown to each other." It contains much that will interest statesmen as well as commercial people. Its seven chapters embrace resources, manufactures, commerce, government, laws, society, and one on miscellaneous matters of general interest. Every South American tariff on imports is given in full, with maps of the respective countries, and a large amount of statistical matter. The work is rounded off with a copious and well-arranged index.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and that of book buyers, give the retail price?—These notices do not supersede review in another page of the Journal.]

Legal Hygiene, or How to Avoid Litigation. By A. J. Hirschl. Published by the Author, Davenport, Ia., 1890. Pages, 203.

Manual of Industrial and Commercial Intercourse between the United States and Spanish America. Edited by Thomas Savage. Published by The Bancroft Company, San Francisco, Cal., 1890. Pages 629.

MAPS RECEIVED.

The South Appalachian Region. Published by J. A. Maher & Co., Johnson City, Tenn., 1890. Price $5. Scale, five miles to one inch.

THE SERVE BOILER TUBE.

Our English exchanges contain accounts of competitive tests made recently at the works of Messrs. John Brown & Co., the eminent steel manufacturers of Sheffield, between a marine boiler fitted with the Serve ribbed tube and a similar boiler with ordinary tubes. The Serve tube is a French invention, and differs from the common boiler tube in having a number of thin longitudinal ribs on its inside, usually eight, which extend radially toward its center. The new tube thus has its heating surface, or that portion exposed to the heated gases, increased. The boilers tested were each 10 feet 6 inches in both diameter and length, and were each provided with 126 tubes, 3¼ inches diameter and 7 feet 6 inches long. The heating surface of each plain tube was 5·95 square feet, and that of each ribbed tube 10·42 square feet. The total heating surface of the ordinary boiler was 956 square feet, and that of the ribbed tube boiler 1,536 square feet. The furnaces were alike, two furnaces to each boiler, each 2 feet 10 inches diameter. The area through the tubes for the passage of the gases was decreased by the ribs, being 802 square inches in the ribbed tube boiler, and 852 square inches in the plain boiler. The grate surface in each boiler was 31 square feet.

In a 12-hour test, in which the induced fan draught was carefully regulated so as to cause the same amount of coal to be burned in each boiler, the amount of coal burned in each was 11,872 pounds and the water evaporated, from a temperature of about 60 degrees into steam at about 10 pounds pressure, was in the case of the ribbed boiler 114,600 pounds and in the case of the plain boiler 103,000 pounds an advantage in favor of the ribbed boiler of over 11 per cent. In another test of three hours' duration the gain in economy was over 14 per cent. Messrs. John Brown & Co. have undertaken the manufacture of boilers fitted with these tubes and it is expected that they will shortly be placed upon the market.

A NEW MODIFICATION OF THE OPEN-HEARTH STEEL PROCESS.

By F. Kupelwieser.

In 1888 the author published some calculations showing that in the open-hearth process the use of molten iron from the blast furnace would be attended with considerable saving of fuel, especially when the amount of scrap in the charge is much diminished, as in the pig and ore process. The heat of fusion of white pig iron being 260 calories, and the make of steel where ore alone is used, or with a very small amount of scrap, being about equal to that of the pig iron, the heat brought into the bath by the fluid metal would be at least 260,000 calories per ton. If this has to be furnished by the combustion of fuel of a calorific value of 7,000, as the Siemens furnace only utilizes about 25 per cent. of the heat developed, the amount required will be at least 3 hundredweight, and proportionally more with fluel of lower heating power. Since the above date this method has been adopted and regularly worked at Witkowitz in three furnaces, where, owing to local difficulties in carrying the iron from the blast furnaces, an empty Bessemer converter, previously heated, was used as an intermediate reservoir. Subsequently the process has been modified by blowing the blast-furnace metal in the converter for two minutes, when the bulk of the silicon and manganese is removed, rendering it more suitable for the basic-lined furnace. The chemical changes are shown in the following analysis:

	Metal from blast furnace.	Metal blown two minutes.
Silicon	0·95	0·26
Manganese	1·77	0·75
Carbon	3·39	3·03

The amount of heat developed in the blowing is theoretically as follows:

Per ton of 1,000 kilograms.	Calories.
From 6·9 kilogram silicon	42,860
" 10·2 " manganese	15,500
" 10 " iron	8,750
	67,110

About one-half of this is, however, lost by radiation, so that the amount added to the metal does not exceed 10 per cent. of that brought from the blast furnace; and as this is subject to further diminution by the losses experienced on the double transfer to and from the converter, the loss and gain of heat probably about balance each other; at any rate the heat added has no particular influence on the working of the open-hearth furnace. The charges at present consist of 90 per cent. cast iron, 10 per cent. scrap, together with the necessary amount of ore for tempering, and some lime for dephosphorizing. The work is done very rapidly; the three furnaces take from 15 to 18 charges, or an average of 17 in 24 hours, and the fuel used varies from 10 to 12 per cent. of the weight of the ingots produced—a result which the author considers as unattained by any previous method of working.—*Oesterreichische Zeitschrift fuer Berg- und Huettenwesen.*

Limits of Taste.—A German exchange states that the taste still clearly perceives 0·0028 sugar, 0·0009 salt, 0·00018 tanin, 0·00009 muriatic acid, 0·0000048 saccharine, and 0·00000048 strychnine.

Public French Opinion on the Length of a Working Day.—Among the 19,455 answers to the list of questions concerning the regulation of the working hours and of work generally which have so far been received by the French Commission, 4,442 are against any and all regulation, 5,012 are in favor of a working day of eight hours, and 9,270 advocate as the number of hours to constitute a day's work 9, 10, 11 or 12; 731 answers are too vague to deserve notice.

The Laurium Lead Mining Company, Greece, raised during the first half of 1890 4,300 tons of lead, valued at 2,175,350 drachmes (say £87,000). The working expenses having been 1,763,204 drachmes, the gross profit stands at 412,145 drachmes plus 8,040 drachmes derived from other sources. The net profit amounts to 117,720 drachmes, and, after deducting government duty of 50,272 drachmes, admits of the payment of 5·50 drachmes per share of 500 drachmes each.

Messrs. E. de Buehler & Co., Berlin, Germany, have, according to *L'industrie moderne*, introduced in their stone-cutting establishment a pneumatic chisel invented by Mr. Laun de Willingen. The apparatus resembles in appearance a syringe which the operator holds with both hands, and as he lets it slide over the surface of the stone or metal, the chisel chips off splinters and particles. Compressed air acting on a piston imparts to the chisel a rotation of from 10,000 to 12,000 revolutions per minute.

A Crack in a piece of metal is prevented from extending further by the well-known means of drilling a hole where the rent ends; but when the hole is not bored on just that spot, the crack is apt to continue beyond the hole. To facilitate the search of the exact point, *Revue Industrielle* recommends moistening the cracked surface with petroleum, then wipe it and then immediately rub it with chalk. The oil that has penetrated into the crack exudes and thus indicates with precision where the crack stops.

Magnificent Railroad Construction.—A commercial traveler, who has just returned from Mexico, reports that he was much struck with the magnificent construction of the Mexican Gulf Railway. The sleepers are of sound mahogany, and many of the bridges and culverts are, he says, built of white marble. Though this might appear, at first sight, to be lavish extravagance, the contractors have found the employment of these substances to be economical, as both mahogany and marble exist in abundance in the country traversed by the line.

Ancient Chinese Miners in India.—An interesting discovery has been made on the Harnhalli gold mine in the Mysore, says the *Indian Engineer*. While sinking the main shaft the workmen broke into an old shaft, dug perhaps a thousand years or more ago. There were found mining implements of various kinds used by the ancient workers. It is supposed the workings were made by Chinese, of whose presence in Mysore there is unmistakable evidence. The tools found are said to be very like those used by the Chinese and unlike anything known to be used by Hindus.

An optico-chemical method by which the presence of lead as an alloy of block tin may be speedily ascertained without injury to the siphon has, says a contemporary, been discovered by a German chemist. Ten milligrams of the suspected metal is scraped off, dissolved in nitric acid, and the solution made strongly alkaline with caustic potash. If this solution turns dark brown on the addition of sulphureted hydrogen water, it contains lead. By making it exactly as above, diluting and comparing it with an accurately titrated solution of pure lead, one per cent. of the alloy can be detected with certainty after a little practice.

The Chronodeik, originally invented by Mr. Chandler, of Boston, has recently been greatly improved by Mr. Palisa in Vienna. Complex astronomical instruments and laborious calculations, otherwise necessary to find the local time, are dispensed with by the use of this apparatus, which only costs 50 marks. It permits the determination of the local time within an error of half a second by two observations of the sun, one in the forenoon and one in the afternoon at any altitude, which, however, must be the same in both cases. The mean of the observed times corresponds to the local noon. The calculation to ascertain the corrective is plain and simplified by tables in *Praktische Physik*, 1890, No. 3.

The Utilization of Niagara Falls.—The Cataract Construction Company, organized for the utilization of the water power, has decided to construct a tunnel of 490 square feet section on a slope of 7 feet in 1,000. The form is rectangular, with a semi-circular arched roof; the width of the tunnel is 18 feet, height from bottom to spring of arch 19·485 feet, arched roof 9 feet radius, with floor concave to a radius of 41 feet, being 1 foot deep in the center. The bottom of the tunnel where it discharges into the lower river will be 20 feet below average water height, so that only the arched roof will be shown above the water of the river. It is estimated hat the velocity of the water in the tunnel will be over 25 feet per second.

Imitation of Marbles.—Good Portland cement and colors that take on that material, are mixed dry and made into a paste with the least quantity of water added. One paste has to be made for each color. The different pastes are placed on top of one another in layers of different thickness; the mass is pressed from all sides and beaten so that the colors of the different parts impress themselves on each other without uniformity. The result is that more or less deep veins penetrate the mass; this is then sawed into plates which are pressed in a mold for 12 days, during which time it is necessary to keep them moist as long as they are not entirely hardened. The plates are polished in the same way as marble.

Submarine Boat.—The French submarine boat "Gymnote" was recently tried at Toulon, and demonstrated its ability to pass through a blockaded line and escape attention in spite of systematic efforts to watch, trace or discover its course. According to the *Revue Industrielle*, it plunged and remained under water forty minutes. It rose to the surface in a distance of more than two miles and a half from its point of departure, and had passed under the watched line of demarcation without being seen. After having ascertained where it was, it remerged to return. It again crossed the line, but this time two of the parties on the look out for it got a glimpse of it, not, however, sufficiently distinct to enable them to trace and pursue it. The course of the boat was in both instances rectilinear.

Magnet for Blast Furnace Use.—Hughes & Gawthrop had on exhibition at the Pittsburg exposition an electro-magnet designed for lifting pig iron from the pig bed in the cast house. It was manufactured by the Thomson-Houston Motor Company. This magnet had a lifting capacity of 7,200 pounds. In shape it somewhat resembled a bell with nearly vertical sides, standing about 20 inches in height, and measuring about 24 inches across the bottom. The thickness of the sides of the bell, if it may be termed such, is about three inches, and within the bell and being flush with it at the bottom was a large coil forming a powerful electro-magnet. The coil is made a magnet by the passage of a current of electricity through it. The magnet, which is attached to a crane, can be raised and lowered The lode can be dropped by simply shutting off the current.

Death Rate in Different Industries in England.—According to an English exchange the annual death rate per 1,000 persons employed is as follows:

	Age 25 to 45 years.	Age 45 to 65 years
Average for the whole country	10·16	25·27
Minimum	4·64	15·93
Maximum	22·63	55·30
Coal miners	7·63	25·11
Iron ore miners	8·05	21·85
Tin miners (Cornwall)	14·77	52·69
Cutlery makers	11·70	34·42
Boiler makers	9·27	26·65
In iron and steel works	8·56	22·85
Average for metal workers	8·80	25·03

It appears, therefore, that coal mining instead of being an "extra hazardous" occupation is in reality one of the safest.

Rope Driving.—*Industries* mentions a new rope driving plant where instead of using a number of separate ropes a single rope is used, which is spirally passed round the pulleys as often as possible. The slack is taken up by a compensating arrangement applied to the last coil, and all the remaining coils are kept tight, both back and front, there being none of the bagging of the slack side usually noticed. The effect of this arrangement is to insure a uniform diameter throughout the life of the rope, and so prevent the unequal engagement of it in different grooves which is observable in the ordinary system. The drag set up by ropes being unequally geared is entirely obviated, and a perceptible improvement in the steadiness of the ropes is noticed. This system is also applied to self-acting mules with success, and it is claimed that much of the loss of power usually existing is prevented.

The Rolland Fireless Locomotive for Mines.—M. C. Rolland, in Mons, Belgium, has constructed a fireless locomotive for use in mines. It is provided with a tank that holds 0·550 cubic meters. The water is heated to 205 degrees C (or an absolute tension of 16 atmospheres) by a boiler placed on the surface; it is sufficient for a steady run of 3 to 4 kilometers. The heating is brought about by means of steam jets, as first proposed by Mr. Bède, Belgium. The heat thus stored up in the rather small space, gradually evaporates the water required to run the machinery. At a speed of 2 meters per second, the locomotive works with 6 h. p., that of a horse being generally estimated at from 0·9 to 1·0 m., so that the locomotive working day and night uninterruptedly, takes the place of from 12 to 18 horses, besides a good many laborers. The savings is calculated to be $200 per horse dispensed with. As a further advantage, this locomotive secures better ventilation. The weight of the locomotive is 3,000 kg.

New Hygroscopes.—*Dingler's Polytechn. Journal* publishes a description of some new apparatus for measuring and regulating the moisture of the air in workshops. In Dr. Rohrbeck's hygroscope an organic membrane contracts or expands according to the quantity of the humidity contained in the air; that movement is transferred to a metal hand, which closes an electric contact arrangement when the moisture exceeds a certain amount, and thereby the water evaporation chamber is closed, and remains so until the dryness of the atmosphere contracts the membrane so much that the metal hand, on its movement in the opposite direction, electrically occasions the reopening of the chamber. C. Admiraal, of Ryp, Holland, employs for his hygrometer a strip of organic matter soaked in a hygroscopic substance and kept in tension by means of a spring. The movement of the strip is transferred, through a toothed segment and wheelwork, to a rod with an inking device at its end. The changing length of the strip is thus recorded on a cylinder revolved by clockwork.

The working population of Paris counts 267,000 men and 232,000 women. The distribution according to trade is as follows:

	Men.
Building trade	80,000
Metal work, machinery, etc	42,000
Tailoring	40,000
Furniture	24,000
Watch making, jewelry, art industry	21,000
Paper, printing, binding	18,000
Wheelwrights, wood workers	11,000
Beverages and eatables	16,000
Textile, ceramics, chemical and other industries	21,000
	Women.
Dress making	195,000
Paper, printing, binding	8,000
Jewelry, watchmaking, art industry	9,000
Textile industry	6,000
Furniture	4,000
Various	10,000

Mitis Metal for Field Magnets.—Professor Silvanus Thompson's Cantor lectures on "The Electromagnet" teem with practical hints, says our London namesake. Speaking of Mitis metal, which is a kind of cast wrought-iron rendered fluid by the addition of a small percentage of aluminum, Dr. Thompson states that he has found this metal far superior to ordinary cast iron, and not much inferior to wrought iron. It is well known that the field magnets of dynamos and motors are made to certain forms, mainly to avoid expensive forgings on the one hand, or inferior results with cast iron on the other. In most cases a compromise is made by using good wrought iron for the straight cores and cast iron for the pole pieces, the latter involving difficult work if forged out of wrought iron. Mitis metal, it appears, if easily produced, would bring about material deviations from existing types of field magnets, especially for the cheaper class of dynamos and motors. Indeed, a reasonably small difference in permeability may be compensated for by some advantageous design which could not hitherto be adopted in the case of wrought iron, owing to structural difficulties. Further research in this direction might lead to important results from a commercial point of view.

Effect of Copper Upon Rubber.—In a paper read before the British Association, Sir William Thomson made interesting remarks relating to the decay of india rubber. The following extract, showing that copper has a marked effect upon rubber when in contact will be noted with interest: Prof. Dewar observed, accidentally, that metallic copper, when heated to the temperature of boiling water, in contact with the rubber, exerted a destructive effect upon it. With a view of finding whether this was due to the copper *per se*, or to its power of conducting heat more rapidly to the rubber, he laid a sheet of rubber on a plate of glass and on it placed four clean disks, one of copper, one of platinum, one of zinc and one of silver; after a few days in an incubator at 150 degrees F., the rubber under the copper had become quite hard, that under the platinum had become slightly affected and hardened at different parts, while the rubber under the silver and under the zinc were quite sound and elastic. This would infer that the pure metallic copper had exerted a great oxidizing effect on the rubber, the platinum had exerted a slight effect, while the zinc and silver respectively had had no injurious influence on it. A still more curious result was this, that the rubber thus hardened by the copper contained no appreciable trace of copper; the copper, therefore, presumably sets up the oxidizing action in the rubber without itself permeating it.

Safety Appliances in Lead Works.—In order to diminish the quantity of zinc and lead oxides in the gases of the lead shaft furnaces, the government works at Friedrichshütte have tried the following arrangement which, according to *Zeitschrift des Oesterreichischen Ingenieur- und Architekten-Vereins* (XLII., III.), reduced the dust 84 per cent.

A central pipe conducts the gases into the cooling tower, whose top part is constructed as a reservoir, from which water flows into 140 vertically suspended condensing pipes, which have a total area of 598 square meters. On the exterior surface of these a great deal of the dust deposits. The gases are then led into a chamber with 50,000 wires hung vertically, each wire 2 meters diameter and 3 millimeters long, the total area being 942 square meters. The gases are drawn into the flue by suction from a Kley ventilator.

The other protective arrangements in use in these works are the drawing of the thick lead fumes from the reverberatory furnace into the flue by suction; a smoke conductor; a device for carrying off lead fumes from desilverization, and lead pumps.

The cases of lead poisoning per 100 laborers, and the number of days of absence because of sickness, which in 1888 were respectively 41 and 539·4, were during 1889, owing to the introduction of these improvements, reduced to 19·8 and 234·7 respectively.

The Production of Coal in India.—According to a recent Indian statistical statement, the production of coal in all India last year was 2,045,359 tons, of which Bengal gave 1,641,354 tons, the Central Provinces 144,465, Assam 116,676, and the Nizam's territory 59,646 tons. In 1880 the total production was 1 019,793 tons, almost wholly in Bengal; in 1883 it was 1,315,976 tons, in 1886 1,388,487, and in 1888 1,708,848 tons. In 1880 the only sources of supply were Bengal and the Central Provinces. The latter yielded 31,928 tons in that year, against 144,465 in 1889. The Assam coalfields were first worked in 1884, when they gave 16,493 tons, and 116,676 in 1889. The Central Indian coal measures were also first worked in 1884, the production being 2,100 tons against 52,956 tons last year. Coal was first worked in the Punjab in 1887, and last year the yield in that province was 32,835 tons. The Central Indian coalfield was first worked in 1885, and in 1889 it yielded 56,956 tons, while the Nizam's territory, which gave only 3,259 tons in 1887, gave 59,646 tons last year. On the whole, during the last decade the coal production of India doubled. At the commencement of that period the only fields worked were those of Bengal and the Central Provinces; at the end there were mines in addition in four other provinces and territories. In Bengal the yield increased from 988,565 tons to 1,641,354, and in the Central Provinces it increased nearly fivefold.

Dr. Puley's Telethermometer.—Mr. Puley has invented a new thermometer, the distinctive feature of which is that temperatures at distant points can be indicated by it. Two conductors whose resistances are affected in an opposite manner by increasing heat, one of 163 ohms and made of carbon, the other a very thin spiral iron wire of 26 ohms, are inserted in a closed tube of thin glass about 20 centimeters long and 0·8 centimeters diameter. This tube, filled with dry hydrogen in order to add to the sensitiveness of the conductors, is placed in the first station whose temperature is to be determined, and connected with another station, which may be several kilometers away, by three wires. In the second station are a sensitive galvanometer, a Leclanché element and a rheostat with a centigrade scale. The carbon, the iron and the rheostat wire make a Wheatstone combination.

When the temperature rises, the resistance of the carbon decreases and that of the iron increases, in consequence of which the point of the rheostat that indicates no difference in potential, will change. When the new zero point is found by sliding the movable contact on the rheostat until the galvanometer shows no current, the temperature is directly read off the scale of the apparatus. The length of a degree being 7 millimeters, the accuracy of measuring is 0·1 degree C., and can be increased by using a mirror-galvanometer. The temperature can also be ascertained by means of a telephone and microphonic current breaker, in which case the position of the contact is changed until the telephone becomes silent.

This telethermometer may prove of great utility for determining the temperature in different depths of the ocean, in mine shafts and bore holes, in the various atmospheric strata, as well as in those industries where it is important to maintain the temperature within certain limits.—*Chemiker Zeitung.*

The Ignition of Explosive Gaseous Mixtures.—Dr. G. S. Turpin, of Cambridge, has been making a thorough investigation of ignition problems, and gave recently the results of his experiments concerning mixtures of carbon bisulphide with oxygen and other gases. He modified an apparatus originally proposed by Mitscherlich in 1877, and improved by Mallard and Le Châtelier. The mixtures are passed through a water valve into a heated and exhausted bulb. Davy, the earliest investigator in this field, observed that slow combustion goes on at temperatures considerably below that at which the mixture takes fire. This seemed to point to a discontinuity between gradual combustion and ignition proper, and led to the recognition of a temperature of ignition. Dr. Turpin finds that such a discontinuity really exists in some cases; whilst in others, especially in mixtures containing a large proportion of inert gases, there is a perfect gradation from slow combination, lasting many seconds, to instantaneous combination, accompanied by a bright flame. The discontinuity seems due to the fact that the slow combustion raises the temperature of the gases above that of the bulb; and in accordance the ignition temperature is higher in a narrow tube than in one of large diameter. This slow combination, however, alters the composition, which has an opposing effect; sometimes this change of composition brings about extinction, unless the combustion is rapid at the beginning. With carbon bisulphide CS_2 the slow combination begins at 100 degrees C; it is attended by the production of a reddish-brown solid, which contains both C and S, and of a fine smoke; sulphuric anhydride SO_2 is formed in abundance, but no CO_2 nor CO. The temperature of ignition is lowest for mixtures with large excess of oxygen; the additions of nitrogen and carbon dioxide, and particularly of SO_2 raise it distinctly as the following figures indicate: $CS_2 + 10\ O_2$, 160 degrees; $CS_2 + 5\ O_2 + 5\ N_2$, 175 degrees; $CS_2 + 2\ O_2 + 8\ N_2$, 290; $CS_2 + 5\ O_2 + 5\ CO_2$, 175 degrees; $CS_2 + 5\ O_2 + 5\ SO_2$, 260. The effect of pressure is complex. The general effect of rarefaction is to lessen the discontinuity while raising the temperature of ignition, owing to the smaller frequency of molecular encounters at low pressure. On the other hand, the extinguishing power of SO_2 was found to be much diminished by rarefaction; and as SO_2 is formed during the slow combustion this effect opposes the former, even when no SO_2 was present originally. Thus the mixture $CS_2 + 10\ O_2$ ignites at 160 degress under a pressure of 760 millimeters after a delay of one or two seconds, and under 300 millimeters pressure at 155 degrees after a delay of 15 seconds.

Representations in Sale of Corporation Stock.—Where an action is brought to recover damages resulting from misrepresentations as to the condition of a stock company, by which one was induced to purchase its stock, the measure of damages is the difference between the value of the stock and the price paid for it. While the market value is ordinarily to be taken as the value, yet in the case of an insolvent corporation it cannot be presumed that the market value of the stock is different from its actual value, and its actual value may be made the subject of proof. Resolutions adopted or declarations made at a corporate meeting are not evidence of the truth of matters recited or declared as against persons not members of the corporation, though they are binding upon the corporation.

Redding v. Godwin, Supreme Court of Minnesota, 46 *N. W. Rep.* 564.

Ownership of Stocks.—During the lifetime of a decedent he purchased certain mining stock with his own money which he had transferred to him as trustee and charged on his books of account to his daughters, to whom he credited dividends paid thereon. They were never given possession or control of the stock, and this being a revocable gift he was at liberty, if he chose, to sell the stock and convert the proceeds to his own use.

Herkimer v. McGregor, Supreme Court of Indiana, 25 *N. E. Rep.* 145.

Increase of Stock.—The owner of certain mines entered into an agreement with certain persons that they should form a corporation, the former to put in the mines, the latter $20,000, the owner of the mines to receive one-half of the stock to be issued. The parties furnishing the money issued to themselves $20,000 in stock. By mistake, the articles of incorporation placed the whole capital stock at $20,000 instead of $40,000. Thereafter, to correct the mistake, a resolution was passed by directors, and assented to by all the stockholders, amending the articles of incorporation and increasing the capital stock to $40,000. The increase in stock having been made with the consent of all the stockholders was binding on them and the corporation, though there may have been irregularities in the proceedings.

Baily v. Chaplain M. & P. Co., Supreme Court of Wisconsin, 46 *N. W. Rep.*, 538.

Exemption of Water-Works from Taxation.—Where the constitution of a State provides that "no man or set of men are entitled to exclusive, separate public emoluments or privileges from the community but in consideration of public services," the legislature has no power to exempt municipal water-works from taxation without exacting for such exemption some public service to the State as a consideration, as such water-works belong to the city in its private capacity, and not as a municipality.

Commonwealth v. MacKibben, Court of Appeals of Kentucky, 14 *S. W. Rep.* 372.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

TUESDAY, NOVEMBER 11th, 1890.

440,130. Machine for Cold-Rolling Metallic Pipe. Thomas J. Bray, Warren, Ohio, Assignor of one-half to the Paige Tube Company, same place.
440,133. Wire Drawing Machine. James E. Burnes, Waterbury, Conn.
440,139. Process of Manufacturing and Tempering Steel. Martin F. Coomes and Arunah W. Hyde, Louisville, Ky.
440,143. Process of Separating Gold and Platinum from other Metals in Solution. Edouard Dode, Paris, France.
440,145. Rotary Engine. Julius M. Farmer, Milwaukee, Wis., Assignor of two-thirds to Colwert K. Pier and Isadore Leiser, same place.
440,157. Roller Mill. Noah W. Holt, Manchester, Assignor to the Geo. T. Smith Middlings Purifier Company, Jackson, Mich.
440,183, 440,184. Steam Injector. Horace B. Murdock, Detroit, Mich., Assignor to the American Injector Company, same place.
440,219. Device for Handling Ingots. Thomas Brady, South Chicago, Ill.
440,235. Steam Boiler Smoke-Consuming Furnace. Martin V. Smith, Pittsburg, Pa.
440,252. Centrifugal Pump. Byron Jackson, San Francisco, Cal.
440,284. Boiler. Carleton Sprague, Buffalo, N. Y.
440,285. Steam Generator. Elisha S. Staples and Rouse H. Arnold, Seneca Falls, N. Y.
440,298. Process of Making Planished Sheet-Steel. George Atkins, Cleveland, Ohio.
440,300. Boiler for Hot Water Heating. Adrien Blondin, St. Hyacinthe, Canada.
440,376. Rod Mill. Horace S Smith, Charles Pettigrew, and William Garrett, Joliet, Assignors to the Illinois Steel Company, Chicago, Ill.
440,397. Wave Power Motor. Herman Commandoer, Milwaukee, Wis.
440,437. Bridge. John C. Phillips, Rochester, Assignor of one-half to William H. Bonslong, Winamac, Ind.
450,460. Slate Jig. James N. Boone and Samuel D. Taylor, Hazleton, Pa.
440,465. Metallic Railway Tie. Joseph J. Callahan, Newburg, N. Y.
440,468. 440,469 Apparatus far Roasting Ores. Edwin M. Clark, Butte City, Mont. Assignor to himself, Edward W. Clark and Lawrence Muldoon, both of same place.
440,480. Roller Mill. Louie E. Kruger, Canton, S. D.
440,485. Liquid-Hydrocarbon Motor Engine. Herbert Lindley and Thomas Browett, Salford, England.
440,488. Boiler Injector. John D. Lynde, Haddonfield, N. J., Assignor to the Hancock Inspirator Company, Boston, Mass.
440,490. Construction of Bridges. Joseph Mitchell, Rochester, Ind.
440,491. Reversible Engine. John Moffet, Bayonne, N. J.
440,512. Manufacture of Ribbed Tubes. Jean P. Serve, Givors, France.
440 527. Steam Engine and Valve Mechanism therefor. Phillip Zimmer, Hammondsport, N. Y.
440,534. Method of and Apparatus for Making Metallic Wheels by Electricity. William P. Bettendorf and Joseph W. Bettendorf, Davenport, Iowa.
440,553. Reversing Mechanism for Steam Engines. Henry T. Farnsworth, Manchester, Assignor of two-thirds to J. Thomson Brown and Joseph W. Blanton, both of Richmond, Va.
440,569. Vibrating Piston Steam Engine. Peter F. Holmgren, Brooklyn, N. Y., Assignor of one-half to John Carlson, same place.
440,572. Ore Crusher. Thomas R. Jordan, London, England.
440,576. Method of Constructing Underground Conduits. Robert D. Radcliffe, New York, N. Y., Assignor of one-half to Hans S. Beattie, same place.
440,577. Combined Tunnel and Cable Railway. Robert D. Radcliffe, New York, N. Y., Assignor of one-half to Hans S. Beattie, same place.
440,587. Ore Separator. Alma Emmons, Galena, Kan., Assignor to himself and R. B. Emmons, same place.

PERSONAL.

Mr. A. Mezger, mining engineer, of this city, has gone to Virginia on professional business.

Mr. C. F. Dunham, mining engineer, has been engaged by the Compañia Minera Fundidora y Apnadora, of Monterey, Mexico.

Mr. J. A. Macpherson, president of the Rappahannock Gold Mining Company, has returned from a visit of inspection to the company's property in Virginia.

Mr. John C. F. Randolph, Consulting Mining Engineer, of New York, who has been absent in Borneo, on professional business, is expected to arrive home by January 1st, next.

Mr. A. R. West who recently resigned his position with Messrs. Fraser & Chalmers has been appointed Superintendent of the Nuevo Leon Smelting Refining and Milling Company of Monterey, Mexico.

Mr. A. J. McCartney, of Youngstown, Ohio, it is said, has been appointed one of three arbitrators to inspect and appraise the coal mines owned by the Union Pacific Railroad, lying between Denver and Salt Lake City. It is said that the appraisement is made with a view of consolidating and selling them to a syndicate.

OBITUARY.

Isaac Bluxome, one of the most noted men in California history during the time of the gold fever, died in San Francisco on the 10th inst. He was the famous "No. 33," secretary of the Vigilance Committee of 1850. Mr. Bluxome was born in New York in 1823.

William Denny, a mining broker and mine owner, of Spokane Falls, Wash., committed suicide on the 12th inst. Financial difficulties are said to have been the cause. He was the owner of a Cœur d'Alêne placer mine, as well as mining interests at Deer Lodge, Mont.

Col. Charles L. Fincke, of Brooklyn, N. Y., died at Ashville, N. C., on the 11th inst., aged 46 years. He was formerly a member of the Stock Exchange and connected with the banking firm of Darnay, Morgan & Co. He was manager of the Brooklyn branch of Henry Clews & Co.

Frederick H. Furness widely known as an antiquarian, collector of Indian relics and compiler of aboriginal traditions, died on the 10th inst. at Waterloo, Seneca County, N. Y., aged 57 years. He was the inventor of the folding sleeping car berth now owned by the Pullman Car Company.

Franklin C. Hill, D. Sc., Pharm. G., curator of the E. M. Biological Museum of Natural History in Princeton College, Princeton, N. J., died on the 5th inst., of heart failure, at the age of 63. Dr. Hill was educated at his father's school in Philadelphia, and afterward was graduated from a college of pharmacy. He spent several years at engineering in Cambridge, when he was called to the Chair of Entomology at Antioch College, Yellow Springs, Ohio. In 1874 he was called to Princeton, and since then has been curator of the college museum and has rendered invaluable services to the college by the restoration of fossils and in labeling, arranging and cataloguing the large collections. Besides his scientific knowledge, he had become an authority on Shakespearean literature, botany and entomology. As a draughtsman his skill was remarkable.

INDUSTRIAL NOTES.

Malleable iron works have been located at St. Paul, Minn. They will employ 30 hands. It is said that these are the only works of the kind northwest of Chicago.

The Clinton Fire Brick Works, of Ashland, Ky., will be in operation December 1st, with a capacity of 12,000 brick per diem. The principal office will be at Ashland, Ky.

The Pittsburg *Chronicle-Telegraph* denies the rumor that Carnegie Bros. & Co. have purchased the rail mills of the Allegheny Bessemer Steel Company, located at Duquesne, Pa.

The Girard Furnace, in the Mahoning valley, of Ohio, it is said, has just terminated a blast of four years' duration, having produced 250,000 tons of pig iron within that time without relining.

It is said that the Southern Iron Company, in consideration of its successful production of basic steel in Chattanooga, Tenn., at a recent trial, has decided to put up a large steel plant at Rockwood, Tenn.

The Ingersoll-Sergeant Rock Drill Company, of New York, has just received a second order for a plant of submarine drilling machinery for removing the Iron Gates of the Danube River, Austro-Hungary.

The Scranton Steel Works, of Scranton, Pa., made on the 6th inst., on one converter bottom, forty-six heats, weighing 400 gross tons ingots. It is said to be the largest run yet on record with one converter bottom.

The Secaucus Iron Company, Secaucus, N. J., during a period of five weeks averaged 587 tons of pig iron per week, with a fuel consumption of a little less than one ton three hundredweight per ton of iron made. For one week the output was 612·5 tons.

The Scranton Steel Company, of Scranton, Pa., rolled 491 Bessemer steel ingots into blooms during one turn of 12 hours on October 30. The blooming was done with a single train, and 56 of the ingots were handled during the last hour, between 5 and 6 o'clock.

The strike in the Pottsville Iron and Steel Company's rolling-mill, at West Hamburg, Pa., was settled on the 10th inst. The strike started because the superintendent found fault with an imperfect billet of iron and refused to pay for its production.

The Fort Payne, Ala., Coal and Iron Company, Fort Payne, Ala., has signed a contract with Philadelphia parties for the right to use the F. G. Bates steel process in the South, and, it is stated, made arrangements for the construction of a plant in Fort Payne at once.

The Riverside Bridge and Iron Works, of Paterson, N. J., have closed a contract with a Mexican syndicate to erect an iron amphitheatre in the City of Mexico. The building will have an iron dome 75 feet high, and it will be 200 feet in diameter, seating about 3,500 people.

The Ashland Fire Brick Works, Ashland, Ky., are being increased in capacity by the addition of a new molding and drying house, 180 × 60 feet, which will enable them to increase their capacity 10,000 per day. Thomas M. Culbertson has recently been elected secretary of the concern.

The Magnolia Anti-Friction Metal Company, of New York, recently received from Mr. C. C. Martin, Chief Engineer of the Brooklyn Bridge, the commendatory statement that the Magnolia metal had been in use for six months on the crank-pin of a 450 horse power Wright engine, and that it gave the greatest satisfaction.

The Edgar Thomson Steel Works, of Carnegie Bros. & Co., Limited, at Braddock, Pa., turned out 32,290 tons of finished steel rails during the month of October. While running at an average output 10,000 tons of material is handled each day. The greatest output of any one of the wire blast furnaces has been as follows: For one day, 457 tons; for one week, 2,462 tons; for one month, 10,604 tons.

Messrs. William Hoskins & Co., manufacturers of Hoskins' Hydro-Carbon Blow-Pipe and Furnaces, of Chicago, Ill., have recently made the following sales: To Carny & Hand, assayers, of Butte City, Montana, complete plant, including a 9 × 15 muffle furnace; Butte Reduction Works, of Butte City, Montana, two 9 × 15 muffle furnaces, with large blow-pipe, complete; Golden Leaf Mining Company, Bannack City, Montana, a complete outfit.

An illustrated catalogue—quite a formidable book—recently issued by the Boughen Engineering Company, of Cincinnati, O., is specially interesting from the fact that it is very comprehensive, embracing about seventy different kinds of engines, boilers, pumps, etc. The company, in its preface, urges the advantage of placing the erection of plants in the hands of a construction company over the present method of purchasing different portions from different individuals, who will each shift the responsibility on some one else's shoulders.

Mr. O. W. Potter makes a statement in regard to his relation to the Illinois Steel Company. That there are some prospective changes in the ownership of the company's stock he does not deny, but he denies the statement that there is any scheme on foot to secure a controlling interest in the great concern in his behalf.—Chicago *Journal of Commerce*.

The Boston *News Bureau*, of Wednesday, states that Mr. O. W. Potter telegraphed Mr. Morgan Rotch, on the 11th inst., to send the paper with the names of the New Bedford signatures agreeing to the sale of the Illinois Steel Company. It is understood that 21,000 shares have signified their assent from New Bedford, and the request from Mr. Potter is indicative of some action on his part in the matter.

Several interesting diagrams of mining exploration boring will be found in a pamphlet lately issued by the Pennsylvania Diamond Drill and Manufacturing Company, entitled, "The Diamond Drill and Its Work." Besides these illustrations the book contains a large amount of information valuable to those concerned in all kinds of mining, boring, shaft-sinking, tunneling, etc. The amount of work accomplished by the above company is very large, as will be seen by the following statement: Aggregate of test holes bored, furnishing cores, 115,478 feet; of well-holes bored, 11,962 feet, or 24·1 miles, in addition to holes for tunneling and shafting. The largest hole bored was one foot in diameter, and the deepest, 2,352 feet.

The annual meeting of the Manhattan Railway Company was held in this city on the 12th inst. The former directors were re-elected without opposition, and at a subsequent meeting of the board Jay Gould was chosen president and R. M. Gallaway vice-president. The annual report showed a net profit of nearly 10 per cent. on the share capital. The gross earnings, according to the report, were $9,507,194, and the operating expenses, including taxes, were $5,260,365. After the payment of first charges and dividends the surplus earnings were $1,006,526. The passengers carried on the several lines were as follows: Second avenue line, 33,479,216; Third avenue line, 73,258,192; Sixth avenue line, 62,907,323; Ninth avenue line, 18,559,146. All lines, 188,203,877. The total number of passengers carried since the opening of the road was stated, as far as November 1st, at 1,408,610,621.

The Ashland Steel Company, of Ashland, Ky., is now erecting a large steel plant. The Pittsburg Iron and Steel Company has the contract of construction. The site to be occupied by the steel plant comprises an area of 11 acres, with 1,120 feet frontage on the Ohio river. There will be two 5-ton converters, with a total daily capacity of 800 tons; three 8-foot cupolas, 58 feet high, measuring 8 feet at the hearth or base; one manganese furnace, two vertical blowing engines, three pressure pumps, 12 boilers, 30 feet long 48 inches in diameter, and containing six 10-inch tubes; 32-inch blooming mill with two reversing engines, also shears. The contract reads that the entire structure shall be completed by July 1st, 1891. The plant will have independent and immediate connection by rail with the Ohio & Big Sandy, Chesapeake & Ohio, and Ashland Coal & Iron Railways, besides available connection with the Norfolk & Western, Newport News & Mississippi Valley, and Scioto Valley Railroads. The capital stock of the company is $1,000,000, controlled principally by the Norton Iron Works, Kelly Nail Works, and Belfont Iron Company. The officers are: Ironton A. Kelly, president; John Russell, vice-president; B. H. Burr, secretary; E. C. Means, treasurer.

Bids were opened at the Ordnance Bureau of the War Department, Washington, D. C., on the 13th inst., for supplying armor-piercing projectiles for the new steel guns now being constructed for seacoast defence. They were as follows: Carpenter Steel Company, of Reading, Pa., 8-inch shot, $150 each; 10-inch shot, $285 each. Midvale Steel Company, of Pennsylvania, 8-inch, $150; 10-inch, $287. Sterling Steel Company, of Pittsburg, Pa., 8-inch, $300; 10-inch, $575. Just how the projectiles are to be made is not specified in the bids. The Carpenter Steel Company has the right to make them under the Firminy secret process, used in England, but it declines to permit the process of manufacture to be observed. The Midvale company has been in correspondence with four leading firms of European shell makers, and while it is willing to permit the manufacture to be witnessed by an inspector, the process is to be kept secret. The Sterling company has been working up its own process, and proposes to use the best crucible steel made from Danamora iron. The requirements of the Ordnance Bureau are based upon European tests and are severe. The 10-inch shot, which will weigh 570 pounds, will be fired at a velocity of 1,625 feet per second, and must pierce a steel plate 11·2 inches thick and emerge without crack or material deformity. The 8-inch shot, fired under the same conditions, must pierce a plate 9 inches thick. The contract has not yet been awarded.

CHICAGO INDUSTRIAL NOTES.

(From our Special Correspondent.)

South Chicago is rapidly assuming importance as a shipping port; 122 arrivals were reported there last month from American ports. Their aggregate tonnage was 117,295 tons, or an average of 961 tons for each vessel; of these 84 were steamers aggregating a tonnage of 106,290, an average of 1,275 tons for each; the total tonnage of the 38 sail vessels was 11,005 tons, or an average of 290 tons each.

A mammoth warehouse for storage purposes is to be constructed on the lands of the South Chicago Dock Company opposite the ship yard at 107th street. Three slips have been excavated at this point 1,800 feet long, 110 feet wide and 18 feet deep. It is proposed to erect on the south bank of the most northerly slip, a fire-proof storehouse four stories high, divided into 10 houses, each 250 feet long by 150 feet wide, making the entire structure almost a half mile long. The building will be of steel, brick and tile, and the largest lake vessels can lay alongside to unload. Rail transportation is provided for by the Fort Wayne, Rock Island, Illinois Central and Belt Line railroads, all of which traverse the western boundary of this slip. One of the sections will, in all probability, be a bonded warehouse. The investment represented in this enterprise will approximate $2,000,000.

The United States Cold Rolling Wire Company has purchased about 1,000 acres near Hammond, Ind. Machinery to cost $150,000 is about completed in Pittsburg and will be shipped here next month. Five hundred men will be employed, and the daily output will be about 500 tons of wire. No furnaces are to be used, as wire will be formed from gold bar steel. The capital stock of the company is placed at $1,000,000. T. B. Bryan, the Jennings Trust Company and Frank Wells are among the principal stockholders. Several other enter-

prises are looking toward Hammond for location, and negotiations are now in progress for many acres of realty, the development of which will be watched with interest.

The election returns show, although precise figures have not yet been reached, that the vote on the World's Fair amendment was practically unanimous. The only opposition assuming any respectable dimensions is found to come from the counties of the southern partof the State, particularly those near St. Louis, where the sentiment against the Exposition was worked to its fullest extent. The City Council has already taken measures for the passing of the proper ordinance for the issue of the $5,000,000 of World's Fair bonds. The Exposition authorities have nothing left in the way now to prevent active progress upon the great work before them.

CHICAGO'S NEW MASONIC TEMPLE.—The JOURNAL of Sept. 20th made brief mention of the commencement of work upon the foundations for this mammoth structure, to be the tallest building in the world. The corner stone has now been laid with all the solemn symbolism and beautiful and impressive ceremonies of masonic rites. Baptized with corn, wine and oil—emblems of plenty, health and peace—it now encloses evidences of the greatness of the Chicago of to-day for generations unborn. For the inception of this magnificent structure Chicago is entirely indebted to her citizens of the masonic fraternity. The lot has a frontage of 170 feet on State and 114 feet on Randolph streets; the amount paid for the ground and leases was $1,100,000. The building will cost not less than $2,000,000. It will contain 18 stories and will be 254 feet high. There is not one dollar of incumbrance on the grounds; from comparisons made with values at which adjacent property is held, it is certainly worth to-day $2,500,000, truly a splendid investment for the Masonic fraternity. While the building will be higher than the Auditorium tower it will be one-fifth smaller in ground space. The contract calls for the best of everything known in the way of material and modern appliances. All the arts of the present century will be employed to embellish its interior and give an attractive exterior. The main entrance will be through an archway on State street 42 feet high and 28 feet wide. The main rotunda will be 45 × 90 feet, running to the roof. The court will be supplied with 14 elevators, facing in a semi-circle the State street entrance, with a capacity of lifting 36,000 people per day; the round trip can be made in three minutes, including stoppage at every landing; the different floors will be named as streets, instead of being numbered; a twelve-foot corridor will run on each floor around the interior of the building; as on the main floor, so on these streets or avenues, stores and offices will be for rent. With the immense elevator facilities altitude disappears; as there are to be no arbitrary partitions lessees can have rooms from 10 × 14 to 60 × 100 feet. This arrangement continues until the seventeenth story is reached. This with the eighteenth will be occupied by the Masonic lodge, drill rooms, etc., the last large enough to seat 1,500 people while viewing the drilling of a battalion; after this the roof is reached, and one will stand on the highest building in the world with a view unsurpassed anywhere; a pavilion will be erected, and a fine orchestra will furnish music—in short, a *nigh* class summer garden will be maintained. The outside of the structure will be brown brick and terra cotta. Of all the great space of 19,380 square feet on each floor, about 7,000 square feet will be taken up by elevator room, etc. It is expected that the temple will be ready for dedication by May 1st, 1892.

SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

Boston capitalists have subscribed $100,000 towards locating car works at Beaumont, Texas. The company is to have a capital stock of $500,000.

Hon. William Anderson has successfully brought to a close the negotiations that have been pending between London capitalists and the Rockbridge Land Improvement Company for $1,500,000 worth of stock. Glasgow, Va., the seat of operations of the Rockbridge Company, is now a rival of Middlesborough, Ky., in the extent of English investments.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

1,141. About 35 tons of 25-pound second-hand rails; also light second-hand locomotive, with 20 gravel cars. New York.

1,142. A complete outfit for a canning factory. Tennessee.

1,143. Dynamo and small electric light outfit. North Carolina.

1,144. A full line of wooden bowl and chair machinery. Tennessee.

1,145. A 40 H. P. engine, a 50 to 60 H. P. boiler, belting, shafting and all appliances and supplies necessary for quite extensive terra cotta and fire brick works. Virginia.

1,146. Three engine lathes, chain feed, 12 inches × 6 feet, 15 inches × 7 feet, 18 inches × 6 feet. Tennessee.

1,147. Twine making machinery, that will make heavy brown twine from flax, 4 strands, and sewing twine from hemp, 4 strands; also state whether the same machinery will make twines of cotton and of various weights of hemp, flax and cotton. Give particulars of cost, capacity, weight and of power and space required. Illinois.

1,148. Price lists and circulars of venetian blinds. Florida.

1,149. A complete brick-making and tanning outfit. North Carolina.

1,150. Two engines, a saw mill, steam pumps, steam drills, barrel machinery, hoisting machinery, etc., for a company that is going in the lime business on a large scale. South Carolina.

1,151. Lathe, planer, drill press, chain pulleys, emery wheels and cutting saws; also ladle of six tons capacity and other general steel foundry supplies Pennsylvania.

1,152. A second-hand ten-stamp mill. Massachusetts.

1,153. A steam hoister to carry stone from quarry to top of lime kilns on an incline iron track; also a steam drill. South Carolina.

1,154. A good machine to cut barrel heads from undressed lumber; a machine for jointing, chamfering, crossing and leveling staves; also a hoop machine for making hoops. South Carolina

1,155. Material for building a railroad two miles long. South Carolina.

1,156. A prominent gas and water company wants to correspond with manufacturers of dynamos and erectors of electric light plants. West Virginia.

1,157. The best and latest improved brick machinery. North Carolina.

1,158. A standpipe 100×12 feet, either material ready for erection or complete; a compound duplex pump, 500,000 gallons per 24 hours, against 125 pounds pressure, with 85 feet piston speed per minute; about 1,000 feet 8-inch pipe, 800 feet 6 inch pipe, and 5,000 feet 4-in. pipe; 25 hydrants, 8 gates; 1 boiler, 14 feet×48 inches; 1 feed pump for same and 1 heater. Specifications furnished on application. Texas.

AMERICAN GOODS WANTED ABROAD.

1,119. Samples and prices of fencing wire; several car loads will probably be wanted. Mexico.

1,159. Catalogues, price lists, etc., of water wheels. Japan.

GENERAL MINING NEWS.

ALABAMA.

JEFFERSON COUNTY.

GILREATH MINING and MANUFACTURING COMPANY.—J. M. Cartwright, James Spence, Joseph Hardie and Belton Gilreath have organized this company with a capital stock of $50,000. The object of the company is the development of coal and iron mines.

LAUDERDALE COUNTY.

October 4th the ENGINEERING AND MINING JOURNAL mentioned the discovery of natural gas in this county. The report has since been confirmed by the finding of it in various places, one of which is on the farm of H. O. Weller, about seven miles from Florence. Several surveys are being made for the purpose of locating bore holes.

ARIZONA.

PINAL COUNTY.

MAMMOTH GOLD MINES, LIMITED.—Mr. P. W. Duffield, mining engineer, of London, England, and one of the directors of this company has arrived at the property. He will examine it in the interest of the English and French stockholders. After looking over the ground, in order to obtain a just and correct idea of the value of the property, it is said, he directed the management to mill 1,000 tons out of the 300-foot level, 100 tons out of the Bridal Chamber and 1,000 tons from one of the drifts, and to ship the gold bullion of each test direct to the company's London office. The mill now reduces 2,500 tons monthly, which will soon be increased to 3,000 tons. The cost of mining, hauling and milling the ore is said to be $3 per ton. As soon as the tramway and the other 50-stamp mill is in operation it is said that the cost will not be more than $2.50 per ton.

CALIFORNIA.

AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—We extract the following from a letter from Acting Superintendent Jones, dated the 7th inst. "The drift running south from No. 2 crosscut has a small vein of rich rock. It is only ten inches wide. If this would only widen out to five or six feet we would have something grand. I am pushing it as fast as possible."

(From our Special Correspondent.)

SAN BERNARDINO COUNTY.

PASADENA, Nov. 5.

Owners of property on Silver Reef, near Old Woman's springs, are endeavoring to induce capitalists to build a silver mill on their mines. They claim to have a large amount of low grade silver ore easily available, which will pay from $3 to $10 a ton.

BLACK HAWK MINING COMPANY.—This company, composed of English capitalists, operating in the San Bernardino Mountains, 40 miles east of Victor, has suspended operations, it is said, on account of low grade rock. This company has expended a large sum of money in an hydraulic placer mining scheme at Holcomb Valley. It seemed to possess abundance of means and no little amount of enterprise. In addition to the the above work it has bonded numerous prospects and purchased a number of tracts of land. At present it is engaged in developing its hydraulic mines on Lynx Creek, near Prescott, A. T. At this point it is building an expensive flume-ditch and dam. It proposed to utilize the water after it has passed beyond the mining works in irrigating a large tract of land in Lonesome Valley, recently acquired by Mr. Peddley, the superintendent of the company.

LAVIC.—The owners of this silver mine are making preparations to ship ore to Daggett or Oro Grande for milling. They have several feet of free-milling chloride ore, worth from $10 to $60 a ton. The ore is cheaply mined and can be transported to the mills by wagon and railway at an expense not exceeding $3 per ton.

COLORADO.

(Special Report for the ENGINEERING AND MINING JOURNAL.)

Following are given the mineral surveys approved by the U. S. Surveyor-General for Colorado during the week ending November 1st, 1890: Survey number 6635, Garfield Land district, Tillie Lode; 6497, Leadville, Bob Ingersoll and St. Elmo; 6577, Leadville, Alice; 6569, Leadville, Forsee lode; 6469, Central City, Ace of Diamonds lode; 6630, Central City, Monarch and Excelsior lodes; 6467, Central City, Quincy, Ben Franklin, Mono extension, Great Center Extension, Lillie Belle and Uncle Sam lodes; 6662, Garfield, Highland Chief lode; 6657, Garfield, Snow Bird, Adams, Blue Jay and Myrtle lodes; 6406, Durango, Lillie Bernard lode; 6648, Garfield, Mina lode; 6664, Leadville, Hattie K. lode; 6663, Leadville, Smuggler lode; 6556, Central City, Comstock, Comstock Extension and Safe lodes; 6333, Leadville, Augusta No. 2 lode; 6649, Leadville, Panama and Mason lodes; 6674, Garfield, Star lode; 6632, Leadville Western Star, Arctic Extension; Arctic and Polaris lodes and Arctic Mill Site; 6707, Leadville, Intersection, Charma and Bedford lodes; 6693, Gunnison, Lead King, Lead Queen, Lead Chief and Lead Prince lodes; 6690, Central City, Burnett Mill Site; 6687, Leadville, Great Hope lode; 6562, Montrose, Queen Bee lode.

BOULDER COUNTY.

U. S. A.—Messrs. Preston & Co. were awarded the contract to drive this tunnel 1,000 feet. It is being run for the purpose of cutting the True Blue and other leads. It has traversed a distance of 400 feet.

LAKE COUNTY.

The owners of the following group of mines, the Excelsior, Juno and the Myrtle lodes, at Leadville, according to reports, are making arrangements with English capitalists to bond the property and continue the work.

A. Y. AND MINNIE.—During the past month they have been steadily opening up a carbonate chute recently struck, with satisfactory results. It is said to be high in lead and run 80 ounces of silver to the ton. At present there are about 10 feet standing in the breast, and, as far as developed laterally, the same grade of ore is seen on both sides. Something over 4,000 tons of ore have been mined and brought to the surface during the past month.

CATALPA AND CRESCENT.—While a slight falling off in the amount of ore shipped in October is noticeable on these properties, they are still putting out about 45 tons per day, and are gradually opening up the property so that an increase may reasonably be expected ere long. Machinery, consisting of a fine double cylinder 35 horse power engine, with ample boiler capacity, is being placed over the discovery shaft of the Catalpa, which is now down about 110 feet, and it is the intention to sink this shaft still deeper, there being hardly any question but that good bodies of ore are in the ground below that shaft. The work will probably start up shortly.

LEADVILLE POWER, WATER AND MINING COMPANY.—Articles of incorporation were filed by this company. The capital stock is placed at $300,000, non-assessable, and the incorporators are T. W. Owens, C. N. Purdy, J. V. Maxwell and B. L. Carr. Water for mining purposes will be taken from the Iowa ditch at Leadville.

LUZERNE.—A lead strike was recently made in this mine. Five years ago a shaft was sunk to a depth of 225 feet on the property by the owners of the American smelter. It was discontinued on account of excessive amount of water. At the time its bottom was in blue limestone. Each year since the suspension of shaft sinking operations the owners executed a certain amount of work. Recent developments in the Lucy B. Hussey and Elk, two adjoining properties, induced them to extend their operations. A 30-foot drift north and east from the 225-foot level showed that the shaft had just hit the apex of a roll in the lime, on the east and north sides of which ore in considerable quantities was found. Since a resumption of operations the shaft was found to be entirely drained. The ore is said to be 1½ feet of carbonate ore inclosed in a body of argentiferous iron low in silver and 50 per cent. in iron.

ONLY CHANCE.—Work has been resumed on this claim, which has been idle for some time. The developments consist of a shaft some 280 feet in depth, in excellent condition, and good shaft, engine and ore houses. Owing, probably, to its proximity to the Dome fault, the contact is very much broken up. The bottom of the shaft stopped in lime, also much broken and heavily iron stained. It is the intention of the present lessee to sink it about 50 feet further and then run drifts in different directions to prospect the ground.

LARIMER COUNTY.

BONANZA KING MINING COMPANY.—This company will have a 10-stamp mill in operation within a few weeks. It will be located at the mouth of the Bonanza King tunnel. There will be power for 30 additional stamps. It is said that the company intends to put in two more mills, one at Manhattan and another near the Elkhorn mine in the cañon.

PITKIN COUNTY.

ASPEN UNITED.—Mr. G. W. Lloyd has taken a lease on this mine. The terms specify that he shall work it continuously for a certain length of time, and pay the company a royalty of 17½ per cent. smelters' returns. The lessee was the former manager of the mine, and in consideration of the present lease is said to have canceled a $4,000 claim which he held against the company. He will put on as large a force as can be worked to advantage, and begin by sinking winzes between the Lake and Old Diminion tunnels. The latter tunnel was in pay ore when the water necessitated a suspension of operations last spring, and it is thought as soon as better drainage can be afforded the mine can begin shipping.

MOLLIE GIBSON.—This mine is making preparations for the establishment of a pumping station at the 600-foot level. Part of the equipment will consist of a compound condensing pump with an 800-gallon per minute capacity.

ONTARIO AND CLIFF MINING COMPANY.—Several Aspen capitalists have formed this company for the purpose of operating mines in the State of Colorado. The incorporators are Franc O. Wood, C. S. Wilson and E. C. Stimson. The principal office of the company will be in Aspen and the operations will be chiefly confined to that district. The capitalization is $600,000 in shares of $1 each.

PIONEER.—Work has been started on this property, says the Aspen *Times*. It is located on west Aspen mountain and was famous for its big outcrop of low grade lead ore. The mine has been idle for several years. George M. Sebree, Major Dorr, of Glenwood, and John McNeil have taken a lease and bond on the property and will prosecute developments. There are two other claims, the Jote Smith and the Sixty-six which are included in the group. The time on the Pioneer is one year and on the other two 18 months. The bond on the former calls for $75,000, on the Jote Smith $25,000 and $35,000 on the Sixty-six. The property will be developed by a tunnel. This has been started near the county road just above the New York tunnel. It will be 300 feet long and cut the vein about 200 feet deeper than the old workings in the Sixty-six.

RIO GRANDE COUNTY.

SAN JUAN MINING COMPANY.—It is now stated that a compromise has about been reached between the majority and minority stockholders of this company, and that work will very likely be started in the spring, if not this winter.

SAN JUAN COUNTY.

LITTLE JOSEPHINE MINING COMPANY.—The jury who have had the case of this Company against William Fullerton and others in the court at Denver since the 3d inst. announced to Judge Hallett on the 6th inst. that they could not agree and there was no possibility of any agreement between them. Judge Hallett told the jury it was very discouraging to hear them confess that they could not dispose of the case, but he presumed they were perfectly candid in their statement that they could not arrive at a verdict and he therefore excused them for the remainder of the term. This is the second trial of the case. The first trial resulted in a verdict for the plaintiff, but a new trial was granted, which has now resulted in the jury failing to agree. The case will be tried before a new jury. It is reported by the plaintiffs' counsel that the jury were 10 to 2 in favor of the plaintiff.

SILVER LAKE.—The mill has begun operations and is working satisfactorily. Coal is being packed up at the rate of a car a day, and everything else is on hand to run the mine and mill all winter. The mill is lighted by electricity. The mine has plenty of ground opened up to keep the mill well supplied with mineral.

ST. BERNARD.—A concentrator, an exact duplicate of the North Star (Sultan) mill, is about completed at this mine at Trout lakes. The mill is about three quarters of a mile from the mine, and a wire tramway connects the two. Mr. Mason, who sold the property to an English syndicate, is superintendent of the company, and Pat Murphy, formerly of the Mendota, is foreman.

VICTORIA CONSOLIDATED MINING COMPANY.—This company has decided to enlarge the equipment of the mill at the Little Dora mine from ten to twenty stamps. This mine is the only one of several claims owned by the company which is worked. The present outfit is five tons of smelting ore and twelve tons milling quartz.

GEORGIA.

LUMPKIN COUNTY.

(From our Special Correspondent.)

W. W. Murry has purchased the Williams lot about five miles from Dahlonega and erected a five stamp mill upon it. A large vein of quartz has been struck on the property which your correspondent is informed will pay well for the working. Water for operating is rented from the Hand Gold Mining Company.

Civil Engineer J. R. Hall has completed a survey of the ditch for supplying water for the Wadsworth Creek Gold placers; its construction will be commenced at once under the superintendence of Capt. Ashbury.

HAND GOLD MINING COMPANY.—The Barlow gold mine is one of the largest properties operated and owned by this company. A 40-stamp mill with a capacity of about 2,000 tons of ore per month is run in connection with the mine. I am reliably informed that the recent rumors that it has changed hands are untrue. It is possible, however, that the mine may be stocked for the purpose of working it more extensively, especially so far as treatment of the sulphurets is concerned. In the ENGINEERING AND MINING JOUNAL of August 30th reference was made to the fact that the mine is rapidly being worked down to the sulphurets, which are said to be very rich. This fact is being confirmed more rapidly than was expected. It is now conceeded that a concentration and chlorination plant must be put in at once. The chlorination process will probably be the Thies process, which is being so successfully operated at the Haile gold mine in South Carolina.

The company is having its big Hand ditch cleaned out. It is 32 miles long, with eight feet grade to the mile, making the total head of water 256 feet. It has a capacity of 1,200 inches per day, only part of which is used by the Hand Company, the remainder being rented to other mining companies along its line.

MILLER & RIPPERLY.—This gold mine has been sold to W. W. Murray, who will develop and work it.

IDAHO.

CUSTER COUNTY.

The developments in the Seven Devils district to which we have referred in various issues continue to be pushed actively, especially since prominent capitalits have made investments in the district; a company of Butte (Mont.) men recently purchased a group of mines for which they paid high figures and since then the Copper Key was sold to a Boston company by Charles Anderson and Al Donart. About $2,000,000 worth of mining property has been sold in that district this year. It is said that another sale is negotiating that will amount to about $2,000,000. The ores of the district are copper with some silver. The veins are large and rich in copper. The district is surrounded by an extensive and rich agricultural country. The two industries taken together support a very large population and build up many industries throughout the State. The developments have caused a substantial move to be made toward the erection of large smelting works similar to those at Denver and Omaha at Boise City.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending November 8th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 3,080,190; zinc ore, pounds sold, 1,071,020; lead ore, pounds sold, 100,000. Sales aggregated a total value of $14,770, and the total value of the output was $16,050.

KENTUCKY.

Our correspondent informs us that Messrs Bradley & Teague have secured franchises to pipe natural gas from Warfield, Ky., to Huntington, W. Va., Catlettsburg and Ashland, Ky., and Ironton, O., a distance averaging 65 miles. Mr. Bradley is now in New York city organizing a company to undertake the work. He is already interested in eight different lines in Ohio, New York and Pensylvania now in operation.

MICHIGAN.

COPPER.

The government engineers are making a survey preparatory to establishing new harbor lines on Portage lake. Negotiations are now being carried on between the government and the canal companies for the purchase of the Portage lake canals (see ENGINEERING AND MINING JOURNAL, October 18th). It is expected that these properties will pass into the hands of the government before the close of the year.

TAMARACK MINING COMPANY.—During October 720 tons of mineral were produced, against 578 tons in the same month of last year. The product thus far in the fiscal year, by months, has been as follows: July, 667 tons; August, 700 tons; September, 704 tons, and October, 720 tons. The 720 tons for last month figures, it is said, at nearly 1,100,000 pounds of fine copper.

IRON.

J. B. Knight, inspector of mines for Menominee county, Michigan, has made his annual report. It shows the following totals: Number of men employed, 4012; number of fatal accidents, 19; number of non-fatal accidents, 112; number of persons killed, 20; number of persons injured, 120; number of men employed to each man killed, 201; number of men employed to each man injured, 33.

MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Nov. 10.

The purchase of 1,000 tons of zinc to be shipped to Europe, as mentioned in last week's report, was consummated at $30 per ton, while the local buyers only offered $28.

The lead ore market is gradually declining, and only few sales are reported at $30 per thousand. Following are the sales from the different districts:

Joplin mines, 982,336 pounds zinc ore and 161,450 lead; value, $18,578.

Webb City mines, 861,246 pounds zinc ore and 43,990 lead; value, $13,360.

Carterville mines, 921,760 pounds zinc ore and 114,320 lead; value, $16,186.

Zincite mines, 155,920 pounds zinc ore and 10,230 lead; value, $2,566.91.

Oronogo mines, 44,000 pounds zinc ore; value, $616.

Galena, Kan., mines, 1,071,020 pounds zinc ore and 100,000 lead; value, $14,770. All districts, total value, $66,076.91.

Many new companies are being organized to open up tracts of undeveloped land. Tracts of land are being sold at from $200 to $400 per acre that could have been bought one year ago at from $50 to 100 per acre. Large tracts of wild land are being purchased in Newton and McDonald counties—all for mining purposes. Mr. Lee Taylor, the veteran miner, has struck a good run of lead at a depth of 55 feet on the James Balance land, two miles north of Joplin. Last Friday Snyder Bros. sold five car loads of zinc ore at $30 per ton for shipment to Peru, Illinois.

JOPLIN CREEK MINING COMPANY.—This comparatively new company, operated by Humphrey, Coover & Co., has fine lots on the Oswego Mining Company's land. They are developed by one large working shaft to a depth of 135 feet, from which a drift has been driven about 100 feet with several cross-cuts, opening up a fair prospect of lead and zinc ore. One new prospect shaft is now being sunk. Fine machinery, consisting of boiler, engines and jig concentrating plant, has been completed, and we understand it is the intention to organize a stock company.

MONTANA.

DEER LODGE COUNTY.

ELIZABETH MINING COMPANY.—It is said that cross-cutting to the vein will commence when the shaft in the Elizabeth has reached a depth of 500 feet. As depth is now 450 feet miners are constantly engaged in the prospecting, and all the work, both in the shaft and outside, is being done substantially.

JEFFERSON COUNTY,

PILGRIM'S PROGRESS.—This mine has been bonded to J. M. Green, for $30,000. The bond is to run until October 1st, 1891. The property is situated almost on the summit of Old Baldy, near Boulder. It was discovered and located by Jas. Perkins last July, and is still owned by himself and B. Barteau.

SILVER BOW COUNTY.

BUTTE & BOSTON MINING COMPANY.—The new 400-ton concentrator at this company's works was started up last week for the purpose of a test. Everything about the new plant worked to perfection, and next week the works will be in full operation. The two new O'Hara furnaces are also finished and work on the four Bruckner furnaces is pushing to completion as fast as possible.

MAJOR BUDD GOLD AND SIVER MINING COMPANY.—The stockholders meeting recently held in Helena. The Company's financial situation was discussed and a proposition was made to reorganize the company and make the stock assessable, the holders to give up two shares of the present stock for one shares of the new issue, and levy assessments on the latter, the majority of the stockholders, it is understood, are in favor of this move, and already the required two-thirds of the shares have been pledged to consummate the new order

NORTH CAROLINA.

GASTON COUNTY.

CATAWBA.—The latest reports from this mine state that there is a large quantity of exceedingly rich ore, which has very recently been opened up. Forty tons of ore, samples of which assay over $2,000 per ton, have been stored in the drifts. New machinery is now being erected, and a large and complete new plant will probably go up early this winter.

GASTON MINING COMPANY.—This company is reported as having purchased several tracts of iron lands from Mr. Vantine, for which the sum of $30,000 was paid. Considerable work is being done, and more is contemplated.

MECKLENBURG COUNTY.

HENDERSON GOLD MINING COMPANY.—It is authoritatively stated that this company has sold its machinery and 85 acres of land to William Mack.

OREGON.

BAKER COUNTY.

(From our Special Correspondent.)

BAKER CITY, Nov. 10.

Quite a number of capitalists from Portland and Walla Walla are here, watching the result of some test working of the "Criley and Everson Oil Process" for the extraction of sulphurets from any ore, as the name signifies, by the use of oil. Your correspondent witnessed a test made on the Eureka and Excelsior ore, which was conducted as follows: The ore was crushed and passed through a 50-mesh sieve, weighed and thoroughly mixed with black, thick oil. To water heated to near boiling was added enough sulphuric acid to give it a tartish taste. This acidulated water was then mixed with the mass of oil and ore. A thick scum of sulphurets rose to the surface and was skimmed off, leaving the hitherto black ore as white as snow—in fact, pure silica. The gentlemen express themselves as pleased, and the citizens of Baker county are in hopes they are, because it means the erection of a large plant at this point.

CHLORIDE MINING COMPANY.—Connection has been made between tunnels No. 2 and No. 3, in this company's mine, and the drift started west from the bottom of the main shaft. Stopes have been opened between tunnels 2 and 3 and several tons of ore are being raised daily and sorted for shipment. Ore shipments will commence by the 1st of November and be continued as long as the weather permits. The company intends to work a full force all winter blocking out the ore bodies that have been been developed and sorting the ores taken out for shipment.

COMPANION.—There is a little history that might be interesting in regard to this property. During the first excitement of the Pine Creek mines two parties of prospectors arrived upon the ground simultaneously. Each party claimed the ledge, but agreed to put a notice in the center of the croppings and each take a claim, one north, the other south. A joint co-partnership shaft was sunk to a depth of 35 feet. Each party bonded its claim for $35,000. The bondholders could find no vein south, and the party on the north end would not sell unless the parties took both claims. The result is that neither claim is being worked.

FORREST QUEEN.—This group of mines is being developed by a Scotch company which has bonded it for a year, paying $2,000 as a bonus. If the group develops satisfactorily, the price will be $30,000.

MAUN PLACERS.—These claims are at Perkinsville and Winterville, 46 miles southwest of Baker City. They embrace 160 acres, six water claims and 22 miles of ditch. This year 1,200 feet of bed rock flume have been put in, and the start has been made to work the ground systematically; $140,000 have been taken from this ground. The prospects are better than ever before.

ROBERT EMMET.—This consists of a large, strong vein of fair grade quartz, with a strong tendency to be, as miners say, "spotted;" very rich free gold also. Tellurides, carrying thousands of dollars per ton, have been found in these spots.

UNION COUNTY.

W. W. & Co.—Considerable excitement has been occasioned by the finding of a valuable pocket in the W. W. & Co.'s claim at "Paddies' Paradise" on Eagle Creek. One pan of oxidized and broken quartz gave as a yield $200 in gold. A nugget worth $25 was also found.

PENNSYLVANIA.

(From our Special Correspondent.)

FRIEDENSVILLE, Nov. 5.

NEBWOTH.—The zinc mines of this vicinity are now being actively worked. The large pump, "President," after being idle for several years, began pumping during the latter part of September and has nearly drained this mine. The haulage plant is being overhauled preparatory to hoisting as soon as the water has receded sufficiently to allow mining to begin.

FRIEDENSVILLE ZINC COMPANY.—Within the past year this company has built two new roasting kilns and is now building four new spelter furnaces containing 54 retorts each.

COAL.

An attempt is to be made to clear the Hunt Colliery at Maltby of water by a pneumatic process. For nearly a year this mine has been flooded and all attempts to clear it have been of no avail as the river water flows in through the crevices in the roof as fast as it is pumped out.

A meeting was held in the Wilkesbarre Coal Exchange building at Wilkesbarre on the 7th inst, at which 90 per cent. of the anthracite tonnage was represented, to agree upon a uniform size of mesh for screens. A committee which had for some time considered the matter recommended the following sizes of mesh: Egg, through 2¾ inches and over 2 inches; stove, through 2 inches and over 1¼ inches; chestnut, through 1¼ inches and over ¾ inch; pea, through ¾ inch and over ½ inch; buckwheat, through ¼ inch and over ⅓ inch; No. 2 buckwheat, through ⅓ inch and over ⅛ inch. The small stove size was abolished. The new sifters will go into effect in January, 1891.

Last spring a co-operative coal company was formed for the purpose of sinking a shaft to test the "B" and "C" veins at Houtzdale, which experienced prospectors were confident lay under the Moshannon seam. A few weeks ago the "C" vein was struck. It was found to be of such thickness and quality that the projectors resolved on further delving. The shaft had struck a fault, but a little further drilling showed 27 inches of coal, 7 inches of slate, and underneath the slate 19 inches of coal, not quite as good as the top, or 27-inch coal. The vein was reached at 160 feet and can be worked, it is thought, with comparatively little difficulty. It is the intention of the Shaft Company to drill about 50 feet deeper to the "A," or lowest vein, for the purpose of proving the thickness and quality of it, and if it turns out as expected the three veins, the "A," "B" and "C," will be worked at one time. The "B" and "C" veins give, all told; nine feet of workable coal of good quality.

A two days' session of District Assembly No. 16, comprising delegates from five Pennsylvania counties closed at Olyphant, Pa., on the 12th inst. Advices received state that a resolution was also adopted urging the appointment of more mine inspectors, on the ground that the present inspection districts are too large. Also one requesting the mine corporations of the Lackawanna and Wyoming regions to reduce the price of powder to the basis adopted by the operators in the Schuylkill and Lehigh regions.

CO-OPERATIVE COAL COMPANY.—This company has reached the B vein in its new shaft. It was first found at a fault. The top, or roof, rolls like waves, and in some places shows the coal to be two feet and a short distance away only a few inches. The coal taken out is said to be of a good quality.

DERRY COAL AND COKE COMPANY.—This company owns 2,300 acres of land near Bradenville. Its coal seam averages 7½ feet, and is reached by a 114-foot shaft. A slope has been driven to the coal for a traveling way for men and stock. One hundred and two single and a double block of 80 coke ovens are in use.

HOSTETTER COAL AND COKE COMPANY.—The large new mines opened and the plant of 300 coke ovens built at Whitney by this company during the past year are now in full operation. The Connellsville scale is the basis on which the miners work.

ST. CLAIR COAL AND COKE COMPANY.—From 250 to 300 tons of coal is hoisted daily, the company shipping all that is not consumed in the ovens.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to November 7th, were as follows:

	1890. Gals.	1889. Gals.
From Boston	2,273,236	4,181,977
Philadelphia	145,012,130	139,563,068
Baltimore	11,651,703	7,159,875
Perth Amboy	13,459,855	14,415,916
New York	393,361,185	383,446,112
Total	565,758,109	548,766,978

SOUTH DAKOTA.

(From our Special Correspondent.)

LAWRENCE COUNTY.

DEADWOOD, Nov. 11.

CARBONATE DISTRICT.

IRON HILL MINING COMPANY.—This company, since the discovery of the Carbonate camp, has been the backbone of the district. In this respect it bears the same relation as does the Homestake to the free-milling belt. Carbonate is located about ten miles northwest of Deadwood. The property of the company consists of the Utica, Antietam, Carbonate, Blue Bird, Carbonate Fractions No. 1 and No. 2 lodes in the Carbonate and the Calumet in the Ruby Basin District. All the development work which has been performed is on the Utica lode; on the others only assessment work sufficient to obtain patents has so far been done. The formation of the district, although flat, is entirely unlike the dry ore district which joins it on the south and west. The dissimilarity lies in the fact that the ore bodies discovered here have the appearance of vertical veins; the one on which work is now being done can be traced in the workings from the 160-foot level to the 300-foot level. We first visited the 300-foot level. Here the ore was struck in a drift running toward the west from the bottom of the shaft and about 200 feet from that point. By actual measurement by the writer the drift was shown to have run in ore for a distance of 78 feet with ore exposed in the face. This body has not been cross-cut so that its width cannot be determined. The ore is a black oxide of iron, carrying chloride of silver and galena in spots, and will yield an average of $18 a ton. At the present price of coke it will hardly pay to smelt this grade of ore. After the Burlington & Missouri River Railroad is completed Wyoming coke will be available at a much lower price.

A great deal of work is being done at present on the 160-foot level in order to pass around a cave which was caused by fire in the mine last January. The stopes which were then yielding ore rich both in lead and silver, were closed by this cave. This ore body is on the east side of the shaft from the 160-foot level to the surface, and Superintendent Bullock informs us that by measurement he estimates that there are 18,000 tons exposed. The tunnels, drifts and crosscuts of the mine are over a mile in length. The company owns and operates a 50-ton lead smelter and a silver mill of 20 stamp capacity. The outcroppings showing ore of the same character as the body on the 300-foot level can be easily followed 500 feet along the brow of the hill on which the property is located.

SEABURY CALKINS CONSOLIDATED MINING COMPANY.—This company owns the Calkins, Chloride, Logan and Ennis lodes. Its property joins that of the Iron Hill. Its ore is of the same character. The development work has been performed on the Calkins lode, and consists of a working vertical shaft 200 feet deep, a prospecting shaft 60 feet, on which work is still progressing, and tunnels, drifts and crosscuts to the extent of 800 feet. Not far from the bottom of the shaft on the 100-foot level in the northwest drift a crosscut 30 feet in length has been run on the ore body, showing that the breast of ore extends beyond that point. It is similar in character and grade to that in the Utica lode. In many places in the workings I detected narrow seams of gold-bearing ore, which widened out into pockets; these were irregular, and apparently not to be depended on. In another drift running from the northwest to the southeast the ore body could be traced for 200 feet.

The formation of the carbonate camp is limestone, at least as deep as any of the workings extend, but, as in the Mutual, a quartzite crops out near the base of the hill, and may prove the theory of a second contact.

SQUAW CREEK DISTRICT.

This district is undeveloped although it has been very thoroughly prospected by Frank Bryant. In his company the writer studied the formation. For a distance of one thousand feet along the creek we could easily follow the outcroppings of dry ore, much of which assays from $10 to $30 a ton in gold and silver, the gold predominating. In some places the work showed that apparently this dry ore was in a vertical vein passing through the first quartzite. Further work is required to prove the truth of this theory.

UTAH.

EMERY COUNTY.

SALT LAKE ASPHALT COMPANY.—This company has filed articles of incorporation. Its business will be to acquire, own and operate mines, especially mineral wax and kindred substances and to reduce, work and manufacture them. The capital stock is $100,000, divided into shares of $10 each. Salt Lake is the principal place of business. The mining claims of the Gumdrop and Rosebud, owned by the company, are situated on the head of Whitmore cañon, in Tidewell and Rideout districts. William S. Burton, Benjamin G. Raybould, Milando Pratt, Ben W. Driggs, Jr., Louis Seckels, Henry M. Dinwoodey and William N. Williams are the directors; W. S. Burton is president, B. G. Raybould, vice-president, and Milando Pratt, secretary and treasurer.

SUMMIT COUNTY.

ANCHOR MINING COMPANY.—The management of this company has decided to raise and tap the bottom of the hole made with the boring machine. The hole was down 325 feet when the machine was stopped and the work abandoned. Last spring the company raised about 200 feet, which leaves now only 75 feet between the face of the raise and the bottom of the hole. It is estimated that it will take about two weeks to work through this distance, and then the Anchor can be drained and the upper levels worked.

ONTARIO MINING COMPANY.—The compressor and engine plant at the Ontario tunnel were

burned on the 2d inst. The loss is estimated at $60,000. The work of driving the tunnel will be necessarily stopped until new buildings are erected and new machinery is put in place, and it is said that it is somewhat doubtful if this can be done before winter sets in.

VIRGINIA.

CRANE'S NEST COAL AND IRON COMPANY.—This company, with a capital of $2,000,000, was organized in Lynchburg, Va., by Lynchburg, Roanoke, Richmond, Baltimore and Southwest Virginia capitalists. The company has coal, iron and timber lands in Wise, Dickenson, Scott and Russell counties.

WASHINGTON.

COWLITZ COUNTY.

ANCHOR COAL AND DEVELOPMENT COMPANY.—This company was recently incorporated in San Francisco, Cal., with a capital stock of $1,000,000. The following officers have been elected: President, Samuel W. Backus; vice-president, C. H. Street; general manager, E. S. Irvin; secretary, J. R. Little; treasurer, J. Shard.

WYOMING.

Advices from Cheyenne, state that a state mining convention will be held in that city about the middle of December. Committees have the project in hand, and citizens generally are said to be interested. There are a thousand representative mining men in Wyoming, exclusive of the hundreds engaged in coal mining. The plan is to send delegates and specimens of minerals from each mining district. A part of the programme will consist of papers on subjects of interest to the profession.

(From our Special Correspondent.)

LARAMIE, Nov. 5.

ALBANY COUNTY.

A plate glass company has just completed experiments with Laramie soda, and find it favorable to the manufacture of plate glass. The city of Laramie is to donate the soda lands, land for building, the sand pit and limestone, and the company is to put up a plant costing $750,000 and employ not less than 700 men.

OTRAS MINING COMPANY, LIMITED.—This company's mines are producing a sulphide ore that runs 20 ounces of gold per ton in car lots. The ore is sold on the Denver market.

CARBON COUNTY.

The excitement caused by the discovery of gold upon the head of Brush Creek does not abate. Even now with two feet of snow anxious prospectors are moving toward the camp. The strike is genuine and a large one. So far there has been five large bodies of quartz discovered. The veins range from 8 to 12 feet and show remarkable richness near the surface. The Leviathan claim has 6 feet of glassy quartz and 6 feet of decomposed vein matter. The quartz carries coarse gold, while the vein matter, as taken from the vein, will average 10 cents to the pan. Various men have "grub staked" miners upon the best prospects. By July next the future of the camp will be definitely known. A better showing at the surface could not be found.

LARAMIE COUNTY.

DAVID KING.—Eastern men have arranged to sink the shaft of this mine and spend $50,000 in development. The mine in 1886 produced a few tons of very rich copper glance which assayed 15 ounces in silver.

HARTVILLE IRON CAMP.—The largest and best iron camp in Wyoming is being developed and purchased by Eastern men. The ore is a red hematite of remarkable purity. It is absolutely free from titanic acid, very low in silicon and phosphorus. When ground this ore makes a very strong paint.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF NOVA SCOTIA.

COAL.

(From our Special Correspondent.)

HALIFAX, Nov. 12.

The coke burners at the Albion mines, Picton county, have demanded an advance in wages. Work continues brisk in this district, and the local demands for domestic fuel are being filled slowly.

In Cape Breton efforts are being made to fill maritime port orders, which have been somewhat neglected during the summer.

It is reported that the union of the coal miners of Nova Scotia will ask from the local government that it will enact laws limiting underground work to eight hours, forbidding the employment under ground of boys under twelve years of age, and those not certified as being able to read and write, and requiring miner before he is allowed to cut coal to have spent a certain time at the face in a subordinate capacity.

ONTARIO.—Work has ceased at this colliery, and the pumps have been removed to the surface. It is not known when operations will be resumed.

GOLD.

At Whiteburn, Queens County, two quartz crushers are being built. The returns of the Dufferin Mill, Salmon River, for last month showed 103 ounces from 475 tons.

The Fifteen-Mile Stream mill returned $7,600 of gold last month. The Commissioner of Mines is officially investigating the claims of the contesting parties at Brookfield, referred to in a recent issue of the ENGINEERING AND MINING JOURNAL. These suits, involving difficulties as to starting points, clearness of applications, etc., are fortunately not complicated by questions of apex.

Mayor Jones, of Parrsboro, has located a bed of magnetite at Lower Economy, said to be of workable size, and to carry 60 per cent. metallic iron, with traces of sulphur and phosphorus.

The report that the Canadian government proposes to put an export duty on nickel ore is premature. It is anticipated that the matter will receive attention shortly before the meeting of Parliament. The Provincial government is preparing an exhibit of Nova Scotian coal and other minerals for the Jamaica exhibition. The increase of population about Stellarton, New Glasgow and Trenton, in Picton County, is becoming decided enough to warrant the steps that are being taken to connect these places by an electric tramway.

PROVINCE OF ONTARIO.

(From our Special Correspondent.)

PORT ARTHUR, Nov. 10.

SILVER ISLET CONSOLIDATED MINING AND LAND COMPANY.—The affairs of this company are assuming such shape, as would evidence the fact that Silver Islet is again about to assume its former position as one of the best producers on the continent. This property was originally owned by the Montreal Mining Company, which operated it in a desultory way, from its discovery in the Summer of 1868, to September, 1870, producing to that date $26,243.06 worth of ore. In September, 1870, it passed into the hands of New York and Detroit capitalists. Their first winter's operations consisted principally of cribbing around the islet, erecting buildings, etc. The time devoted to mining was about four weeks. The total amount spent that winter on improvements was $80,000, and the total value of the ore extracted during the same time, $92,153.23.

From Nov. 1870 to Nov. 1871, the lode produced $647,932 worth of silver. This body of ore was not worked out till the latter part of 1874 and yielded a little over $2,000,000. The total product up to the end of 1879 was $3,039,557.49, and when operations ceased in 1884, the total yield had reached $3,250,000.

Extensive explorations have been made on the company's property this summer, notably at Edwards Island, nine miles east of Silver Islet, and at Cape Gargantua and Cape Mamainse. Test pitting has been carried on on the large vein at Edwards Island, the greatest depth attained being 23 feet.

Wm. M. Courtis, M. E., of Detroit, examined the property recently and made a very flattering report on the development work done, and the prospects of the future. He reports the occurrence of native silver, in beautiful forms, associated with black arsenic, samples of which the writer has seen. The main dyke crossed by this vein appears to be identical with the famous dyke on Silver Islet. It carries Macfarlanite, Neccolite, Graphite, Arseneous Silver and Copper pyrites. The steamer Mary Ann left on the 31st ult. for the mine with a cargo of lumber, machinery and general mining outfit, and a crew of miners and surface laborers. The company proposes to erect a large boarding house, office, stable, storehouse, and engine and shaft house. The hoisting engine will be placed in position as soon as the necessary buildings can be erected.

Sinking will be carried on to a depth of 175 feet when drifting will be commenced. At this point it is calculated the vein will intersect No. 1. A portion of the ore from the bottom of the shaft is being saved; from the general appearance of the vein it is thought that barreling will soon be commenced. Capt. Thos. H. Trethewey has just returned from an exploring trip on the company's property at Cape Mamainse, where he located 12 veins, carrying native yellow sulphuret and green carbonate of copper. No. 1 vein is on Sand Bay location. It outcrops 56 chains from the water's edge, is five to eight feet wide; it can be traced on the surface for five-eighths of a mile; its strike is northerly seven degrees west and its dip easterly. It commences in the low ground, and rises gradually to a height of 300 feet above Lake Superior. Two shafts, 60 and 78 feet deep, respectively, and three test pits from 8 to 35 feet deep, have been sunk on this vein. In the different pits it carried native silver, native copper, black oxide, red oxide, and green carbonate of copper, together with copper pyrites and gray ore.

No. 2 vein, 1½ miles inland, is over three feet wide at the surface; strikes north five degrees west and dips easterly. Specimens taken from the surface, which were shown to the writer, would average 20 per cent. copper. No. 3 vein is two miles in land. It has the same strike dip as the above veins and is similar in character. The copper is in a fine state of division. At 2¼ and 3 miles inland, two massive fissure veins were discovered, the gangue being similar to the others. Five veins were located on the northern portion of the property, all of which carry copper in considerable quantity. On the south location three veins were located. One of these on Pancake Point has an average width of 7 feet, strikes north 24 degrees west, and dips easterly. The gangue is composed chiefly of calcite, deeply stained with green carbonate of copper. Another vein on the same Point is from 3 to 5 feet wide, shows native copper, green carbonate and gray ore. Three test pits were sunk on this vein, which gave very encouraging results. The formation is the well-known Keweenawan copper-bearing series, and consists of a series of belts of conglomerate, trap and amygdaloid. The strike of the formation is southeast and northwest, having a general dip of 22 degrees to the southwest. The veins cut the formation at an angle of about 45 degrees, and fault the formation laterally from 25 to 130 feet.

The extent of copper bearing territory at Mamainse i about one-half the size of the copper district embraced in the middle section of the Keweenaw peninsula, and is said to be similar in almost every respect. At present there are only 17,000 acres of land patented, all of which is held by two companies. It is the intention of the Silver Islet Company to begin active mining and thorough exploratory work on their properties at the opening of navigation in 1891.

PROVINCE OF QUEBEC.

(From an Occasional Correspondent.)

BLACK LAKE, Nov. 8.

SCOTTISH CANADIAN ASBESTOS COMPANY, LIMITED.—The mines belonging to this company are equipped with seven air compressors, rock breakers, cornish rolls, revolving picking tables, screens, etc. About 2,000 men and boys are worked by the company. Last year 6,000 tons of ore were mined; the amount this year will be over 7,000 tons. Some of it sells as high as $210 per ton; the average price for the year is from $125 to $150 per ton.

ECUADOR.

PORTOBLLO GOLD MINE.—News from this mine farwarded to the English company working it states that it is using 20 stamps, and it is said returns one ounce per ton from an 18-foot lode.

RUSSIA.

The *Gazette Russe* announces the recent discovery of large silver mines as the Kouban sources, Russia. The land belongs to a mining company, which has ceded the working of it to an engineering specialist, he being the same person who established the existence of these mines. It is said he has discovered more than twenty deposits of silver and lead, some of which were worked in olden time, although in a most primitive fashion. Deposits of coal have been discovered in the same district. Searching examinations have proved the unexampled richness of these silver mines, and an analysis of the samples extracted has shown that the ore contains a large proportion of metal. The most distant deposits are only 140 verts from the railway, and the roads leading thither are kept in good order. Further, the river has a plentiful supply of water and its current is rapid, which will facilitate the establishment of works.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alliance, Utah	9	Oct. 15	Nov. 15	Dec. 8	.10
Baker Divide, Cal.	18	Oct. 7	Nov. 11	Dec. 4	.20
Big Camas, Idaho	5	Oct. 15	Nov. 17	Dec. 17	.05
Challenge, Nev	7	Sept. 26	Oct. 28	Nov. 17	.50
Con. Imperial, Nev.	29	Oct. 13	Nov. 15	Dec. 8	.05
Creston, S. Dak	2	Oct. 15	Nov. 15	Dec. 2	.001
Florence, S Dak	5	Sept. 24	Nov. 15	Nov. 30	.004
Goleta, Cal	1	Sept. 16	Oct. 27	Nov. 24	.10
Hale & Norcross	96	Oct. 7	Nov. 12	Dec. 3	.50
Martin White	24	Oct. 17	Nov. 24	Dec. 16	.25
Mexican, Nev	41	Oct. 18	Nov. 20	Dec. 10	.25
Mono, Cal	30	Sept. 18	Oct. 28	Dec. 2	.25
North Peer, Ariz.	6	Oct. 1	Nov. 5	Nov. 25	.05
Prior Hill, S. Dak	1	Oct. 27	Nov. 29	Dec. 15	.004
Russell, Cal	7	Oct. 13	Nov. 17	Dec. 8	.05
Seabury-Calkins, S. Dak	13	Oct. 27	Nov. 29	Dec. 20	.01
Seg. Belcher	7	Oct. 7	Nov. 10	Dec. 1	.25
Silver Hill	27	Oct. 8	Nov. 13	Dec. 3	.20
Silver King, Ariz.	4	Sept. 20	Oct. 28	Nov. 18	.30
Sterling, Cal	1	Sept. 16	Oct. 27	Nov. 24	.06

DIVIDENDS.

Bi-metallic Mining Company, dividend No. 5, of thirty-five cents per share ($70,000), payable Novemoer 15th, at the office of the Company, in Philipsburg, Mont.

Commonwealth Consolidated Mining Company, dividend No. 1, of twenty cents per share ($20,000) payable November 20th, at the office of E. R. Grant, No. 57 Broadway, New York City. Transfer books close in San Francisco, Cal., November 17th.

Cœur d'Alene Silver-Lead Mining Company, of Idaho, dividend No. 10, of five cents per share ($25,000), payable November 27th.

Hartery Consolidated Mining Company, stock dividend of fifty per cent. of the capital stock, payable immediately, at the office of the company, at agency of Citizens' Bank, Grass Valley, California.

Little Chief Mining Company, dividend No. 14, of five (5) cents per share ($10,000), payable Decem-

ber 11th, at the office of the company, No. 41 to 45 Broadway, New York City. Transfer books close November 26th and reopen December 12th.

May Mazeppa Mining Company, dividend No. 6, of one per cent. ($10,000), payable November 15th, at the office of the company in Denver, Colo.

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 589 and 590.

NEW YORK, Friday Evening, Nov. 14.

The week under review has been a singularly uneventful one so far as the market for mining shares is concerned. The recent financial disturbances in Wall street have had their effect, and while we do not observe any marked general decline in prices we note a very small volume of business. The market was neglected by all, and altogether featureless.

Of the Black Hills stocks we note a solitary sale of 100 shares of Homestake at $9, the lowest price recently paid. Transactions in Caledonia have been light, and only 600 shares at 75@80c. were sold.

There were no sales of the copper stocks during the week.

Silver King was neglected at 41@43c. Of Phœnix of Arizona, 1,100 shares at 70@77c. changed hands.

Horn Silver was traded in to the extent of 850 shares at $3.20@$3.30. Transactions in Ontario aggregated 250 shares, at $40.75@$41.50.

Of the California shares. Quicksilver preferred shows sales of 100 shares at $40, and common of 300 shares at $6 to $6.50.

Transactions in Astoria are reported to have aggregated 12,200 shares at 6c. and 7c. Sutter Creek was stationery at $1.15.

Brunswick consolidated shows, also, apparently large transactions, 8,700 shares at 7c. and 8c. In point of numbers the aggregate sales of this stock and that of Astoria, as reported in the official lists of the Consolidated Stock and Petroleum Exchange, equal one-half of the total sales for the week.

Mono shows a solitary sale of 400 shares at 95c.

Of the Colorado stocks there is a single sale of chrysolite at 33c. Leadville Consolidated was steady at 15c. and was traded in to the extent of 1,700 shares, while of Little Chief 1,500 shares at 33c. to 40c. changed hands, the latter figure being the closing price. This company has declared a dividend of 5c. per share, the first in a long time.

Mutual Smelting and Mining Company shows sales of 1,400 shares at $1.45@$1.50.

Silver Mining, of Lake Valley, has a solitary transaction at $1, the highest price yet paid for this stock on the exchange.

The Comstock appear weaker and lower. Consolidated & Virginia declined from $4 to $3.90. Crown Point shows one sale at $2.20, and Gould & Curry another at $2.30. Hale & Norcross was neglected at $2.25. Ophir was lower than last week, the only sale reported having occurred at $4. Savage was quiet at $2.40@$2.55. Sierra Nevada declined from $3.15 to $2.70. Alta was quiet at $1.40@$1.55. Andes shows up at the Exchange this week with sales aggregating 600 shares at $1.95@$2.10. The first quotation being the closing price. Best & Belcher has one sale at $3. Bullion was quiet at $2.90@$3.35. Comstock Tunnel has one sale of the other stock at 16c. and of the bonds, another at $2.30. Exchequer declined from $1.45 to $1.10. Julia was fairly steady at 35@39c. Mexican opened at $3 05 and declined to $2.50. Scorpion was stationary at 40c. Union Consolidated was quiet at $2.30@$2.45, as was also Utah at $1.05@$1.20. Occidental shows one sale at $1.25.

Commonwealth Consolidated has declared its dividend No. 1 of 20c. per share.

Boston. Nov. 13.

(From our Special Correspondent.)

The market for copper stocks the past week has to some extent felt the depressing influence of the general stock market, and prices were off for one or two days under the pressure to sell, but to-day there is a marked improvement in the general tone of the market, and large orders to buy stocks resulted in an advance of nearly the whole list. It is noteworthy that in the general depression, coppers have held their own so well, and are the first to show recuperative powers. The strong position of ingot copper and the belief that higher prices for the metal will be obtained during the coming year, are without doubt the stimulus which induces buying, and your correspondent still holds that good stocks bought now will show large profits to the purchaser within a few months.

Allouez has been quite firm during the week, and all efforts to depress the price, on reports of an assessment soon to come, failed to get it below $4¼; the stock was strong to-day, with sales at $5¼.

Atlantic touched $14, as the lowest point for week, but recovered and sold to-day at $17½.

Boston & Montana sold as low as $43, but recovered to $47¾. Butte & Boston was also forced down; it sold at $12¼, but was up again to-day to $16½. The reports from this mine of recent date, are very encouraging; the lower levels of the East Gray Rock and the Silver Bow, now being opened, are said to be richer than ever.

Calumet & Hecla sold down to $260, but advanced on good buying to $275.

Centennial was depressed to $12, and recovered to $16½, while Kearsarge sold down to $10½, recovering to $15. The report from the latter mine is that its bottom is looking very rich.

Franklin, after selling down to $14½, recovered to $18, and is in better demand at this price than when at its lowest.

Osceola sold during the pressure, ex-dividend, at $31; to-day it was up to $36¼.

Tamarack sold as low as $142½; to-day it sold at $160.

Quincy, which has been quite heavy of late, declined to $75; an order to purchase stock to-day at best carried it up to $102.

National sold at $1½ and Huron at from $4½ to $5.

Santa Fe declined to 40c., and rallied later to 45c.

In silver stocks Dunkin sold at 70c., Napa Quicksilver at $4.

3.00 P. M. The prices at the close of the market were a fraction lower than the highest for the day, the exception being Quincy, which was offered at $95 with $90 best bid.

By Telegraph.—Calumet & Hecla, $270; Tamarack, $160; Quincy, $85 bid, $91 asked; Boston & Montana, $46; Osceola, $34½; Franklin, $17; Atlantic, $17; Centennial, $16; Kearsarge, $14; Butte & Boston, $15½.

Denver.

Prices and sales for the week ending Nov. 8th.

Company.	Opening.	H.	L.	Closing.	S.
Alleghany, Colo	13¼b	*16	14	14½	2,300
Amity, Colo	03¾b	07	‡04¼	06	39,400
Bangkok, C. B., Colo	08	*08¾	07¾	07½	3,000
Bates-Hunter, Colo	46b	46	43½	46	7,500
Brownlow, Colo	07½	07½	06	06	2,400
Calliope, Colo	32b	32	22	22	1,700
Cash, Colo	10b	*14b	10b	12½	.....
Clay County, Colo	90	*105	90	99	4,100
Hard Money, Colo	02½b	05b	02½b	05	.....
Leavenworth	63	65	62	65	400
Little Rule, Colo	88b	89	88	89	8,400
Matchless, Colo	.....	75b	50b	50	.....
May-Mazeppa, Colo	104b	105	104	104b	400
Mollie Gibson, Colo	25b	35b	35	25	200
Oro, Colo	47b	60b	50b	63	.....
Pay Rock, Colo	05b	*05¾	05¼	05¼	7,200
Puzzler, Colo	08b	*08¾b	08¼	08¾	2,000
Reed-National, Colo	69b	70b	69b	69	.....
Running Lode	21½b	23	22½	20	2,000
Silver Cord, Colo	37b	39	39	35	500
Whale, Colo	16½b	*18	*18	16	500
Prospects:					
Argonaut, Colo	.....	22b	20½b	22	.....
Aspen United, Colo	‡06¼	07b	05½	06¼	9,100
Big Indian, Colo	08	*11	08	10½	7,400
Big Six, Colo	06b	07¼	06	07¼	22,600
Century, Colo	32	34	32	33½	4,800
Claudia J. Colo	‡07	*07	06¼	06½	16,000
Nat. G. & O. Co.	18½	*25	18½	21	3,100
Diamond B., Colo	02½	03	02½	03	7,800
Emmons, Colo	33	*36	33	35	4,000
Golden Treasure, Colo	21b	21½b	21	21	200
Ironclad, Colo	07b	07b	06b	06½	.....
John Jay, Colo	13b	*15	13	13	900
Justice	15	15	15	15	2,700
Legal Tender, Colo	03b	*05½	03½	04¾	11,400
Morning Glim, Colo	45b	46b	41	46	6,700
Park Consolidated	26b	34	29½	34	3,600
Potosi, Colo	07¼b	07¼	07	07	1,200
Rialto, Colo	58b	61	59	58	1,500
Total for the week					185,400

*Buyer 30 days. †Buyer 60 days. ‡Seller 60 days. §Seller 30 days. a Asked. b Bid.

St. Louis. Nov. 12

(From our Special Correspondent.)

The mining market here has had a fair amount of business transacted this week, much better than last week, when the election seemed to absorb the interest of all.

Central Silver managed to make its usual good showing, though to a very erratic market. Opening at 25c. on Wednesday, Nov. 7th, it had soon reached 27½c. with 700 shares sold. On Friday 28¼c. was reached. Saturday showed a decline which was augmented on Monday, quotations falling to 23¾c., the present quotation. During the week 3,100 shares changed hands.

Mickey Breen had a fall this week of 30c., and closes at $1.45. 6,300 shares were sold during the week. It is reported that L. L. Culver, President of the Mickey Breen Mining Company, is in London, negotiating the sale of the property to an English syndicate, and that he cables that "owing to the stringency in the money market, the option has been extended thirty days."

Think of $221 being the sum total of a day on the Mining Exchange floor, yet that was all Saturday could show.

A report of the condition of the Major Budd Mining Company shows its debt to amount to $15,313 and 93,841 shares of treasury stock as its assets. The remaining portion of the 500,000 shares are in the hands of the stockholders. An assessment of .06c. per share is to be made on all the stock, payable prior to Dec. 15. The stock is quoted at .05c. with 200 shares to this week's credit as sold.

Gold King experienced a boom this week. Quoted on Wednesday at .05c., it now brings 14c., with 20,000 shares sold on Tuesday at 15c.

Granite Mountain continues to settle down, and if that "English syndicate" wishes to buy up the stock it will have no need for accepting the option on it at $35. Opening at $45, it is now bid at $43, with $45 asked. On Tuesday, 50 shares sold at $45.

During the week Yuma sold 17,000 shares at prices ranging from 48½@52½c., and closed firm at 55c.

Aztec had a sale of 500 shares at 10c.—the first one in a long time.

Adams showed some activity this week, and advanced 10c. During the week 700 shares were sold. $1.85 is the present quotation.

Sales for Pat Murphy amounted to 2,000; for Small Hopes 100 shares. Both stocks remained firm at 11½ and 87½ respectively. Silver Age advanced from $1.75 to $1.95, and sold 100 shares.

Kansas City. Nov. 10.

Company.	Opening.	H.	L.	Closing.	Sales.
Argonaut	24†	....	....	....	.....
Bates-Hunter	42½	44½*	44½	44½†	3,300
Big Six	7½	7½	7½	7½†	900
Cash Gold	14*	14*	13	13†	9,900
Clay County	98†	....	....	98†	.....
Diamond B	2½†	....	....	2¾	.....
Hard Money	3½	3¾	3½	2½†	700
Hunki Dori	6½	6½	6½	6½†	100
Iron Clad	7½	9*	7¼	7¼†	2,000
Kansas City M. & M. Co	2.67½	2.67½	2.67½	2.67½†	100
Kansas City, Col	15½	17*	15½	16†	400
Leavenworth	64½	71‖	64½	65½†	29,300
Little Nugget	97	97	97	97†	100
Little Rule	90*	90*	90*	88†	400
May Mazeppa	1.00†	....	....	1.00†	.....
Minnequa Zinc M. Co	5	5	5	5†	200
Monte Cristo	3¼	3¼	3¼	2¾	100
Morning Glim	39†	....	....	39†	.....
Pay Rock	5¼†	....	....	5¼†	.....
Pelican	20‡	....	....	....	.....
Potosi	9¼	10¼‖	10¼‖	9¼†	100
Running Lode	25	25	25	24†	200
Sylph	13	13	13	13†	100
Total					47,900
Pit sales					1,000

†Bid. ‡Asked. * Buyer 30. § Seller 30. $* Seller 60. ‖Buyer 60.

Lake Superior Iron and Gold Stocks

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25.00	$60.00	$66.00
Aurora Iron Co	25 00	8.50	9.50
Champion Iron Co	25 00	100 00	102.00
Chandler Iron Co	25.00	40.00	42.00
Chicago & Minn. Ore Co	100.00	115.00	118.00
Cleveland Iron Co	25.00	17.00	18.00
Germania	25.00	11.50	12.00
Jackson Iron Co	25.00	110.00	125.00
Lake Superior Iron Co	25.00	70.00	75.00
Milwaukee Iron Co	25.00	5.50	6.50
Minnesota Iron Co	100.00	83.00	87.00
Montreal Iron Co	25.00	9.50	10.00
Norrie (Metropolitan)	25.00	75.00	78.00
Odanah Iron Co	25.00	17.00	18.00
Pittsburg Lake Angeline Co	25.00	175.00	200.00
Republic Iron Co	25.00	39.50	41.00

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Mg. Co	*	....	....
Grayling Gold & Silver Co	$25.00*	....	....
Michigan Gold Co	25.00*	....	....
Peninsula Gold & Silver Co	25.00*	....	....
Ropes Gold & Silver Co	25.00	2.00	$2.25

*Quotations nominal.

The petroleum market this week has been inclined to be weak in sympathy with the stock and grain markets. Speculation in it is extremely limited, but what little business is doing is with a downward tendency in prices. We think the market will go considerably lower on Pennsylvania oil.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 8	76	76	74½	76	118,000
10	74⅝	74⅝	74	74	15,000
11	74	74¼	71	73½	55,000
12	73½	73½	73	73	18,000
13	74½	74½	73	73	10,000
14	72¾	72¾	72¾	72¾	8,000
Total sales in barrels					236,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 8	76½	76½	75½	76⅞	30,000
10	75⅝	76⅝	74⅛	75	79,000
11	74⅞	74⅞	72½	73⅞	48,000
12	73¼	74	73¼	74	108,000
13	73¾	74	73¼	73¼	72,000
14	73⅛	73⅛	72⅜	72⅜	48,000
Total sales in barrels					385,000

BUCKEYE PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 8	*	....	....	....	.....
10	17	17½	16	17	12,000
11	15	16	15	16	2,000
12	*	....	....	....	.....
13	*	....	....	....	.....
14	16½	16½	16½	16¼	2,000
Total sales in barrels					16,000

* No sales.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, November 14.

Statistics.

STATEMENT of shipments of anthracite coal (approximated) for the week ending November 18th, 1890, compared with same period last year:

Regions.	Nov. 8, 1890.	Nov. 9, 1889.	Difference.	
Wyoming Region. Tons	425,369	419,906	Inc.	5,463
Lehigh Region "	131,629	137,759	Dec.	6,130
Schuylkill Region "	268,649	245,559	Inc.	23,090
Total..... Tons	825,647	803,224	Inc.	22,423
Total for year to date Tons.....	30,060,902	30,386,075	Dec.	325,173

PRODUCTION OF BITUMINOUS COAL for week ending November 8th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.....	2,031	114,591	72,310
Cumberland, Md.....	*84,261	3,303,084	2,618,395
Barclay, Pa.....	*3,490	132,477	102,715
Broad Top, Pa.....	10,040	431,261	295,271
Clearfield, Pa.....	79,794	3,189,816	415,163
Allegheny, Pa.....	18,512	1,082,980	698 067
Beach Creek, Pa.....	30,291	1,624,445	1,345,568
Pocahontas Flat Top.....	34,257	1,601,028	1,462,739
Kanawha, W. Va.....	46,271	1,789,401	1,573,212
Total	308,947	13,272,083	8,583,830

* Estimated.

WESTERN SHIPMENTS.

Pittsburg, Pa.....	16,760	706,410	568,185
Westmoreland, Pa.....	25,267	975,641	1,301,992
Monongahela, Pa.....	13,779	455,400	331,456
Total	55,806	2,137,451	2,401,633
Grand Total.....	364,753	15,409,534	11,988,163

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending November 8th, and year from January 1st, in tons of 2,000 lbs.: Week, 104,434 tons; year, 4,559,313 tons; to corresponding date in 1889, 3,778,569.

Anthracite.

The amount of business done in hard coal during the week was not encouraging for this time of year. Indeed, the week was one of the dullest since late spring and closed with the market slightly weaker than it has been in some months. There are several rumors afloat of underselling to secure business, but it is stated that it is not "company coal" that is cut. Generally speaking, this may be true, but in one instance at least stove coal changed hands at a trifle less than $4 f. o. b., while the agreed November rate is $4.40 and that of October was $4.30. The sales agents failed to hold a meeting on the 13th owing to a lack of a quorum. But they compared notes and arrived at the conclusion that the market was in fairly good shape in spite of the (to coal men) unfavorable state of the weather. Never did vernal spring days receive more maledictions than now, and never were there more sincere invocations to the Clerk of the Weather to break the run of mild winters which seems to have set in.

There is no offer of or demand for November prices yet, and the prevailing opinion seems to be that unless the output is very considerably restricted for December, they may not be reached this year. There is a tolerable certainty, however, according to several of the sales agents, that the tonnage for December will be materially less than that for November, unless the long-expected and hoped-for winter weather should arrive in the meantime. Although cars continue scarce there is little lack of hard coal for buyers.

While the larger sizes in the best qualities continue fairly firm under the circumstances, pea and buckwheat are a shade weaker, though holders have very decided ideas about its market value. It is expected that the reduced output for December will impart a bracing tone to this commodity.

November prices are: Stove $4.40; egg, $4.10; broken, $3.75; chestnut, $3.95; pea, $2.15@$2,25, free burning, $2.25@$2.50 on board; buckwheat, Lehigh, $1.60; free burning, $1.75 on board.

Bituminous.

The bituminous market is on the rise. This is as much owing to the booming demand as to scarcity of the material. None of the companies or jobbers are taking new business unless on very favorable terms, as they have more than they can do to properly fill existing contracts. For soft coal at Philadelphia the limit quotation has recently been $2.50 per ton. During the past week several offers were made for large quanities for early delivery at that figure and declined. Th's is a fair indication of the stiff condition of the market, as that price was not obtained until a week or two since.

"The demand," said one large operator, "is so great at this time that it is far in excess of anything yet known to the trade in this country. We shall all raise prices ten to twenty-five cents in a short time."

The expected relief in the the shape of a fleet of vessels has not materialized. Vessels are very short at all shipping points, and freights are much stiffer. At Philadelphia captains now ask $1.05@$1.10 to Boston, and at Baltimore $1.15@$1.20 to the same port. Cars are so scarce that serious inconvenience is felt. It is stated that the Pennsylvania Railroad Company has itself suffered in this respect in the supply of coal for its locomotives, and is seizing the coal of the companies to release cars and relieve its necessities, contending in self-defense that if the coal were not taken it could not be moved.

Labor matters in all the soft coal regions are in a satisfactory condition. No doubt the difficulty in moving a sufficient tonnage to meet current demand, and the accumulating tonnage at the mines has served as an object lesson to the men in the various sections where trouble has been fermenting since July.

Though we cannot quote higher than last week's prices, as no transactions have been recorded at higher figures, it is safe to assert that the prices below are the lowest at which business can be effected: Baltimore, $2.40 f. o. b.; Philadelphia, $2.50; New York, $3.15; alongside, $3.40.

Boston. Nov. 13.

(From our Special Correspondent.)

Anthracite coal is in small demand at quotations. An occasional small order appears, which is handled at a disadvantage, for many agents are willing to shade prices. The cutting which is being carried on is of a serious nature. The leading agents here are holding stove at $4.40 f.o.b. New York, although buyers do not find it difficult to fill their orders as low as $4.20, and in some few cases figures below that have been obtained.

The position of the bituminous market is practically unchanged. Coal is coming forward slowly and agents are compelled to give old business their whole attention. There is a good inquiry for stock, very little of which is to be found on the spot. Agents report their inability to make shipments, and claim that with the present order of things at the mines they are are unable to get anywhere near the amount of coal desired. Prices are held firm at $3.65@$3.75 on cars.

Freights continue firm. Vessels are scarce, and suitable sizes are taken readily at full prices. The recent storms along the coast have had much to do with the present feeling. Vessels at New York are quoted at 75c.; from Philadelphia, $1@$1.10, and from Baltimore, $1.10. Several charters have been made at Baltimore at $1 20.

The retail demand has eased during the past week, owing to mild weather. The retailers had a good trade all through October, which lessened their great stocks, and at present they have only fair supplies. Prices hold firm, and there is no coal selling below the Coal Exchange prices.

There is a pronounced scarcity of gas coals here, and many large consumers are offering inducements to agents to supply them.

The Mystic wharf trouble still exists, and there is no immediate outlook for relief. Cars continue as scarce as ever.

The coal receipts at the port of Boston for the week ending November 8 were 49,133 tons of anthracite and 16,501 tons of bituminous, against 95,489 tons of anthracite and 26,665 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,523,418 tons of anthracite and 846,076 tons of bituminous against 1,506,575 tons of anthracite and 872,441 tons of bitumi nous for the same period last year.

Buffalo. Nov. 13.

(From our Special Correspondent.)

The anthracite coal trade is reported to be generally dull for local requirements, as well as for nearby, interior and Western points. No change in quotations.

Bituminous coal in good demand, with orders not readily filled in consequence of lack of transportation facilities. The market fluctuates with regard to prices; the quoted figures are unchanged, although concessions are oftentimes made to save car service demurrage, or to work off a consignment of say 10 or more cars in one dicker. A dealer says that trade on the whole would be called satisfactory if more cars could be obtained, thereby saving the unpleasantness of apparent neglect in filling orders. The demand for vessels will cease in a few days.

Reports of cutting schedule prices come from all directions, especially New York and Philadelphia. A well-informed man says: "The anthracite coal business has again fallen into such a state that nothing but protracted cold weather is likely to stimulate it very much." The demand for hard coal from the West continues good, but the mining and carrying companies are reported to be monopolizing that trade, the smaller individual operators being unable to get cars to ship their coal.

Many line propellers have gone into winter quarters, and others are making their last trips of the season to upper lake ports.

The plans for supplying increased natural fuel gas facilities from Canada to our city are delayed from the inability of the company to procure sufficient pipe. Six miles have been laid in Canada thus far, and the territory to be supplied on this side of the Niagara river is being piped with great rapidity.

"The rapidly growing commercial importance of the city of Buffalo," says a correspondent in describing the extension of the Lehigh Valley Railroad through western New York, "is due to the safe conclusion that at no future time can the trunk lines threading the country to the westward drive the enormous fleet of merchant carriers from the lakes. Nearly half of the fresh water of the globe surges past her harbor mouth down the stormy rapids of Niagara, and the products of an empire come to her wharves; lumber from Alpena, Cheboygan and Mackinaw City; flour from Chicago, Milwaukee and Duluth; grain from all the lake ports, iron and copper from Marquette, Ft. Ignace, Gladstone, Ashland, Portage Lake, etc. Manufactured goods, coal, cement, etc., pour through Buffalo in a constant rich exchange between the busy East and West. In the handling of all these products Buffalo has grown prodigiously."

A dispatch from Fort William, L. S., says that the Canadian Pacific Railway Company's stock of 85,000 tons of coal at that place is burning; one-half of the docks were on fire. A later dispatch says 15,000 tons has been entirely consumed and fire still raging.

There has been considerable activity in coal freights for several days, predicated on the near approach of the close of navigation. Duluth and Lake Superior rates have advanced 20c. Vessel men firm in their views. Considerable freight is yet to go forward to Western lake ports, and if consignors wish to take advantage of the inland waterway they must pay what the agents ask.

The shipments by lake of coal from this port from November 6th to 12th, both days inclusive, were 99,740 net tons, distributed about as follows: 40,900 to Chicago, 33,550 to Milwaukee, 4,300 to Superior, 4,150 to Toledo, 13,060 to Duluth, 400 to Saginaw, 2,000 to Gladstone, and 1,380 to Bay City. Total thus far this season to date, 1,902,075 net tons. The rates of freight were: 75c. to Chicago and Milwaukee, 60c. to Gladstone, 40c.@60c. to Duluth and Superior, 40c. to Toledo, 40c. to Saginaw, 30c. to Detroit, and 25c. to Bay City. Closing firm.

No special canal freights reported.

The canal statement of coal movements for the first week of November shows the receipts to have been 1,442 net tons and the shipments 2,337 net tons.

Chicago. Nov. 12.

(From our Special Correspondent.)

There will, of course, be an increased business in the Chicago coal market both for shippers and retailers as colder weather approaches, which recent snow and cold waves in the West indicate to be near at hand; prices as advanced are firm and well sustained, and the usual scare of $10 coal has made its appearance in the local papers.

Receipts by all rail are still delayed by insufficient car service. Lake shipments to this port have been quite fair, still lake coal is about 80,000 tons short of the amount received per vessel up to November 1st last year, which runs the total shortage up to enormous figures. Now the close of navigation is at hand, and railroads talk strongly of advancing freights; this was attempted last year this time, but the open winter prevented; the present prospect of colder weather, and the short supply of anthracite will probably induce all the trunk lines to advance the rate which is now $3.50, a lesser figure somewhat than it has been during winters previous to last. Lake freights from Buffalo were advanced 15 cents, and it is reported that on November 17th the freights by rail will be advanced 25 cents per ton from the same point.

Wholesale prices are f.o.b. Chicago: Large egg, $5 50; small egg, range and chestnut, $5.75; Lehigh lump, $7.

The retail prices fixed by the Chicago Coal Exchange are: Large egg, $6.75; small egg, range and chestnut, $7.

The protracted inefficiency of the car service continues to restrict supplies. The demand is good and bids fair to continue so, but business is seriously handicapped. Illinois operators advanced miners' wages lately, and the recent advance made in prices will about cover the increased cost of labor.

Quotations per ton of 2,000 pounds are: Erie, $4.25; Pittsburg, $3.40; Indiana block, $2.50; Blossburg, $4.15; Greene and Sullivan County (Ind.), shaft, $2.25@$2.40; Jackson Hill, $3.45; Jackson shaft, $3.45; Hocking Valley, $3.30; Youghiogheny, $3.40. Wilmington, Mt. Olive and other Illinois coals at Chicago group points, $1.75 per ton.

The threatened labor trouble in the coke district has passed over, and a small strike ended. The supply is somewhat better, still by far not near up to requirements. Poor car service is felt more if possible in this market now than it has been at any time yet. Prices will probably go up at ovens at an early day. Quotations are: Connellsville, 72 hour, $5.20; domestic crushed, $4.10@$4.25; Elk Lick, 72 hour, $4.25@$4.50 per ton of 2,000 pounds f.o.b. Chicago.

Pittsburg. Nov. 13.

(From our Special Correspondent.)

Coal.—The firmness previously noted has been fully maintained. Coal continues scarce; the week's shipments to lower ports reach 1,500,000 bushels. The increased demand for home consumption is increasing. A number of private families have returned to coal; others are preparing to

follow, as the price of gas will be advanced on the first of December 50 per cent.

The present rates are:

Per 100 bushels.		Per 100 bushels.
1st pool.....$4.75	3d pool.....	$3.90
2d pool..... 4.50	4th pool	3.25

Railroad coal, $5.00@$5.50.

Connellsville Coke.—The cry still continues for more cars, and demand for motive power is the chief characteristic of the trade. So far we have learned of no suspension of furnaces on account of scarcity of coke; there is no telling how soon that will occur. Orders from the West have been large. Pittsburg and Eastern districts have held out well for some weeks. October shipments reach 577,550 tons; week's increase, 750 cars; shipments West, 4,440; East, 1,260; Pittsburg, 1,100; total, 6,800 cars.

The rates were for 2,000 pounds f. o. b. cars at ovens: Blast furnace coke, $2.15; foundry coke, $2.45; crushed coke, $2.65.

Freights to Pittsburg 70c. per ton; Mahoning and Shenango Valleys, $1.35; St. Louis, $3.35; Cleveland, $1.70; Chicago, $2.75.

FREIGHTS.

From Philadelphia to : Alexandria, †.85; Boston, .85@1.00; Marblehead, *1.00; Milton, *1.20; Newburyport, .85; New York, †.90; Norfolk, .70; Salem, .85; Washington, †.85.

METAL MARKET.

NEW YORK, Friday Evening, Nov. 14.

Prices of silver per ounce troy.

Nov.	Sterling Exch'ge	Lond'n Pence.	N. Y. Cts.	Nov.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
8	† 81½	47¼	1.02¾	12	4.84	47⅜	1.02½
10	..	47¼	1.02½	13	....	47⅜	1.02¾
11	....	47⅜	1.02¼	14	....	47⅜	1.02¾

Demand for silver on India account has absorbed considerable amounts. About 660,000 ounces have been shipped to London this week, and there are orders in the market for more. Further shipments for the immediate present, however, depend on a more settled condition of the exchanges with London.

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

	Price. H.	Price. L.	Sales.
Nov. 8	103	103	282,000
Nov. 10	103¼	102½	403,000
Nov. 11	103⅛	102½	403,000
Nov. 12	103	102⅝	197,000
Nov. 13	103	102¾	102,000
Nov. 14	103⅜	103	100,000
Total sales			1,487,000

The United States assay office at New York reports total receipts of silver for the week to be 27,000 ounces.

Foreign Bank Statement.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount, and it remains at 6 per cent. During the week the bank lost £407,000 bullion, and the proportion of its reserve to its liabilities was reduced from 34·90 to 33·20 per cent., against an advance from 39·77 to 41·41 per cent. in the same week last year, when its rate for discount was 5 per cent. On the 13th inst. the bank gained £50,000 bullion on the foreign balances. The weekly statement of the Bank of France shows a loss of 1,250,000 frs. gold and a loss of 75,000 frs. silver, against for the same week of last year a loss of 1,300,000 frs. gold and 2,225,000 frs. silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .80	$ .82
Mexican dollars	.80	.83
Peruvian soles and Chilian pesos	.73	.75
English silver	4.80	4.84
Five francs	.94	.95
Victoria sovereigns	4.84	4.93
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.02½	1.03½

Copper.—In spite of the heavy trials which the Stock Exchange had to undergo during the present week and the consequent very unsettled state of the money market, values of copper have remained unchanged, and we do not even hear that any concessions have been made in prices. The demand has been rather slack and the transactions consequently small, but we still have to hold lake copper from first hands at 17c., and it appears that the quantities offering from second hands must have been reduced, as very little is obtainable at 16¾. Under these circumstances it is natural that some accumulation of stocks must take place with the mining companies, but as they have had no reserves whatever for the past year, this is not at all alarming. Other sorts are quite unchanged at the prices recently given, viz.: Arizona copper 15¼, and casting copper, according to brands and quantity, 14½@14¾.

The London market opened on Monday rather lower: £56@£56 2s. 6d. for spots, and 5s. higher for three months. Improved afterward to £57 5s. for spots, and £57 12s. 6d. for three months, but declined again to £57 7s. 6d.@£56 10s. for spots and 5s. higher for three months. We quote for refined and manufacturing sorts as follows:

Tough, £62@£62 10s.; Best Selected, £65@£66; Strong Sheets, £70@£71; India Sheets, £67@£68; Yellow Metal Sheets, 6¼d.@6½d.

Advices from abroad report a quiet market for refined sorts during the last few weeks.

The outcome of the great French copper corner is reported as follows: The Paris *Matin* of November 12th says the report of the liquidator of the Societé des Métaux shows that, despite the rise in the price of copper, the shareholders of the company will receive nothing. The debenture-holders and other creditors will receive only 34 per cent. The final liability of the company is estimated at 111,000,000 francs, and the assets at 38,000,000 francs.

The exports of copper during the past week were as follows:

To Bristol—	Copper ore.	Lbs.	
S. S. Landaff	207 bags	32,550	$2,500

Tin.—The market has been weak and prices have slightly given way during the week. Consumption continues to be good, and of the heavy quantities arrived here lately the bulk has been trans-shipped. The cause of the decline cannot be looked for so much in this market as in the decline in London. Only one vessel, the Glenavon, a direct steamer from the East, has arrived with 175 tons. We quote to-day: Spot at 21@21·05; November, 21@21·05; December, 21 and January, 20·95.

The London market was rather dull and transactions comparatively light. The market opened at £94 5s.@£94 7s. 6d. for spots; improved in the middle of the week £1, but lost this advance again and closed to-day at the lowest, £94@£94 2s. 6d. for spots and £94 5s.@£94 7s. 6d. for three months.

Lead.—Values have declined for natural causes, viz., the arrivals of heavy quantities of lead from abroad and the almost entire abstention of consumers from the market. We hear that no further shipments are being made from abroad, and as the West is not yet shipping any lead to Eastern ports, it may be fairly assumed that a livelier market is to be looked for at the lower prices. Small transactions have taken place early in the week at 5·20@5·15, but later on 5·10 has been accepted. Consumption, which has been suffering somewhat from the high prices, is now again going on at a very satisfactory rate.

The London market is also reported somewhat lower, Spanish being quoted at £14, and English at £14 5s.

St. Louis Lead Market.—Messrs. John Wahl & Son telegraph us as follows: "The demand for pig lead continues to be very light. Buyers are predicting lower values, and, consequently, engage only enough metal to last them from hand to mouth. Transactions will probably not aggregate more than 300 tons for the week, at prices ranging from 4·85@4·80c."

Chicago Lead Market.—Messrs. Everett and Post telegraph us as follows: "Lead keeps fairly at 4·95@5c. asked, but trading has been light, and there are few sales to report."

Spelter.—This metal remains exceedingly scarce, and there are hardly any stocks in the city. Makers appear to be entirely sold out to the end of the year, and we hear that large orders have already been given out for delivery over next year. Some shipments of ore have taken place from the Joplin district to Europe, which stiffened prices quite considerably. There is no doubt that the consumption is fully equal to production, although the latter is again slightly larger than last year's. We quote: Prime Western, 6·10. Quotations in London are: Ordinary brands, £25@£25 2s. 6d.; special brands, £25@£25 7d. 6d.

Antimony.—A fair business has been doing at somewhat hardened prices, and we quote: Clarkson's at 20½@21, L. X. at 18¾@19, Hallet's at 17¾@18.

Quicksilver.—The market for this metal has been exceedingly quiet for the week. We quote: London, £10, and New York, $56@$57.

IRON MARKET REVIEW.

NEW YORK, Friday evening, Nov. 14.

In this market there is little to cheer those concerned, so far as new business, or general activity is concerned. Beyond the supply and demand of regular consumption there is scarcely anything to note of interest. A transaction of a thousand tons or so of pig iron, or old or new rails, attracts as much attention just now as would transactions of ten times that volume in ordinarily busy times. It is not by any means stagnation; it is rather preparation, for future activity.

There are already hints that both Northern and Southern furnaces may be induced by financial necessity to market their product which they are now holding expectantly. Pig iron warrants, too, are being offered that have been firmly held for some time past in expectation of a phenomenal boom which could have no sound commercial foundation. The iron trade is steadily, not spasmodically, progressing, and the present quiet is one of the inevitable but temporary features.

American Pig Iron.—While it is said that the stocks of pig iron at the furnaces are not large, dealers here claim to carry very small stocks. What the stocks at the furnaces really amount to may shortly be demonstrated, as it is reported on the market that financial necessity will shortly compel several furnaces to unload their stocks. But the difference between buyers and sellers is not so great that this will necessarily weaken this market, which continues dull, but certainly firm at prices quoted. Warrants are being offered freely, but sellers and buyers are a trifle too far apart just now. We quote: Northern iron, No. 1 X, $17.50@$18; No. 2 X, $16.50@$17. Southern, No. 1 X, $16.50@$17.50, and No. 2 X, $15.50@$16.50.

Scotch Pig Iron.—Importers state that scarcely any Scotch pig iron is being shipped from the other side, and little if any business is doing in it "to arrive." The labor troubles in Wales and Scotland have kept the English prices up for the past month, so that much of American pig has been substituted for Scotch where the former was until recently always used. It was reported during the past few days that the strained situation in Scotch pig in England was less intense, and that a reduction in prices was being made, which, however, if such be the case, will scarcely find its echo in this market for some weeks. Prices quoted must be accepted as nominal in the absence of any but the most insignificant transactions. No. 1 Coltness, $24.50; Dalmellington, $22; Eglinton, $21.25.

Spiegeleisen and Ferromanganese.—The small amount of new business in these ores shows little sign of increasing. Importations are very insignificant, owing to the stocking-up last year when prices were way down. As past contracts, now being executed, do not make a present market price, and, as dealers differ by from 5 to 10 per cent. in prices asked in the absence of real business, quotations given are not to be taken as a real indication of present values. A large buyer in the market, meaning business, could secure substantial shading. Quotations are: For 20 per cent. spiegeleisen, $30.50@$31, and for 80 per cent. ferromanganese, $68@$69.

Steel Rails.—The steel rail market has been exceedingly dull. We hear of no sales of any consequence. The recent Wall street disturbances have had their effect on this market. Some railroads which sent in applications for quotations and bids, have withdrawn, and other roads that wished to buy rails asked for time and offered securities which were declined by the mills. Rails are held, nominally, at $29 at mill, but a lower figure might be obtained to secure a desirable order.

Rail Fastenings.—Though this line is firm as to price, no business is reported by any of the dealers. The stagnation, however, is not expected to continue, and a busy season is looked for and being prepared for. Last week's quotations prevail: Spikes, 1·95@2c.; angle plates, 1·72@1·76c.; bolts and square nuts, 2·70c; hexagonal nuts, 2·90@2·95c.; complete joint, iron and steel, according to weight.

Tubes and Pipes.—This branch of the iron market gives satisfaction to all concerned. The mills have all they can do to meet existing contracts several of which are of very large volume, and will require some months to be completed. New orders keep coming in and have to wait their turn. The association congratulates itself on the healthy condition of affairs, and schedule rates are stiff. We give the following ruling discounts on car lots: 47½ per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47½ on lap, galvanized; boiler tubes, 45 on 1¾-inch, and smaller; 50 for 2 inches and larger. Casing, all sizes, 50 per cent.

Structural Iron.—Business in structural iron is another bright spot in this market. The prevailing general dullness finds no reflection here. Makers are hampered and harrassed by the demand, and the prices remain satisfactory to makers. Several of the larger companies complain that their draughtsmen cannot keep up with the increasing demand for structural iron in the new buildings going up and in contemplation. The manufacture of iron, telegraph and electric light poles, which is daily increasing is a considerable factor in the present activity. The association does not seem to be frightened into reducing prices by the rumored intention of one firm to import a large lot of German beams, as the increase in the consumption of beams during the year is stated by an expert at nearly 100,000 tons. Prices are: Universal plates, 2·30c.; bridge plates, 2·40c.; angles 2·20@2·30c.; tees, 2·65c.; beams, 3·10c.

Merchant Steel.—Dealers report a slight improvement in business, but quotations show no change either for better or worse. We quote

best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·60c.; open-hearth spring, 2·60c.; tire steel, 2·60c.; toe calks, 2·60c.; flat file, 4¾c.; mill file, 5¼c.; taper file, 7¼c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—We hear of some sales of old rails at private terms. Nominally, holders ask $25.50@$26 and $26.50@$27 for tees and doubles, respectively.

Chicago. Nov. 12.

(From our Special Correspondent.)

All Chicago iron industries continue in a prosperous condition generally. Consumption of crude material continues heavy, and there is a steady flow of moderate sized orders. Furnaces and foundries are well employed, but more or less embarassed in their operations by insufficient transportation facilities, caused by the long-standing complaint—scarcity of cars. The market may be said to be stronger, if anything, and the demand for crude material on the increase. The volume of tonnage moving is satisfactory to dealers, and the amount of last week's business is fully up to that of preceding weeks. Concessions on any of the standard brands are now entirely out of the question. In some cases where charcoal irons have been offered under current rates prices are now stiffer than ever, and nowhere do we hear of any lower quotations than $19.50. Southern cokes are selling fairly well, and demand is good for soft and silvery grades. Lake Superior charcoal is in good demand from car wheel makers. Stocks in foundry yards are known to be light, the result again of poor car service. Demand is also good for Northern cokes.

Pig Iron.—There has during the past week been a marked absence of large orders but a great many inquiries for small lots and these comprise the bulk of sales effected. Consumption is heavier than ever, while production is not proportionately increasing; as a consequence stocks are decreasing, it is estimated, at the rate of about 50,000 tons per month. Although there are no notable changes in quotations, slight advances may be expected soon.

We quote to-day for cash per ton of 2,24, pounds, f. o. b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, $19.50@$20; Lake Superior coke, Bessemer, $18.50; Lake Superior coke, Bay View No. 1, $17; No. 2, $16.50@$17; No. 3, $15.50@$16; Southern coke No. 1, $16.50@$17; No. 2, $16@$16.50; No. 3, $15.50@$16; Southern charcoal, $19@$19.50; standard Southern car wheel, $22@$24.50; Ohio softeners, Hanging Rock, $18@$18.50; Jackson County, $18.25@$18.75; Hanging Rock, cold blast, $26@$28; warm blast, $23@$25; No. 1 Scotch, according to brands, $26@$27; American Scotch, $19@$20; Bay View Scotch No.1, $17; No. 2, $16; Chicago Scotch No.1, $17; No. 2, $16; Emma Scotch, $19@$19.50; black band, Hubbard Scotch, $18.75; Haselton, $18.75; soft silvery, $18; Wellston No. 1, $18.75; No. 2, $18.25; Hamilton No. 1, $19.25@$19.75; Norton No. 1, $17.50@$18; Zanesville No. 1, $18.75@$19.25.

Structural Iron.—A large business is doing, and shipments are heavy on contracts. Inquiry continues heavy for iron and steel bridge work, also for large buildings. Some scarcity of tees is reported. Prices are firm. For car lots, f.o.b. Chicago, iron and steel angles, $2.35@$2.40; Universal plates, $2.55; sheared plates, $2.50; tees, $2.85@$3; beams and channels, $3.20. Store prices are: Angles, $2.50@$2.60; tees, $3@$3.10, and beams and channels, $3.50@$3.70.

Bar Iron.—Consumers are inquiring freely for bar iron, and some good orders have been placed. The high price of muck bar at the valleys has caused a stiffening in prices here. Local and nearby mills quote: $1.80@$1.82½ half extras f. o. b. Chicago. Mahoning Valley mills name $1.75 for half extras at mill. Dealers quote $2.10@$2.20, according to quality.

Black Sheet Iron.—Demand is light and trade dull. Mill quotations are $3.05@$3.10 for No. 27. Store trade is good at $3.35 for the same gauge.

Galvanized Sheet Iron.—Demand continues very good, and some mill agents have been compelled to refuse business on account of inability to take care of it. Although stocks in warehouses are being rapidly reduced, no change is noted in prices. Quotations are, for both cheap and standard brands, 60 per cent. discount on Juniata, and 60 and 5 per cent. on charcoal from store; jobbing lots are quoted according to quantity desired.

Merchant Steel.—Merchant steel is in good demand; tool steels and specials moderately so; prices are firm and unchanged. We quote as follows: Tool steel, $7.75@$8; specials, $12@$25; open-hearth machinery, $3; Bessemer machinery, $2.50@$2.70; open-hearth spring steel, $2.75@$2.80; tire, $2.50@$2.60; toe calk, $2.70@$2.80; sleigh shoe, $2.40@$2.50; cutter shoe (T. & B.), $2.65@$2.70; crucible sheet steel, $7@$10; crucible spring, $3.75.

Plates, Tubes, etc.—Trade from stock is good; mill business is moderate. Some mill orders are taken, but they are neither heavy nor numerous. Prices are firm and unchanged. Tank iron, $2.70; tank steel, $2.90; heavy sheets from 10 to 14, $2.90@$3; steel sheets 10 to 14, $3.25@$3.50; shell iron, $3@$3.25; flange iron, $4@$4.25; flange steel, $3.50; shell steel, $3.25; boiler rivets, $4@$4.25; fire box iron and steel, $4.75@$5.50; boiler tubes, 4½ inches and larger, 52½ per cent.; 2 to 4 inches, 50 per cent., and 1¾ inches and smaller, 45 per cent.

Nails.—Steel cut nails have about touched bottom at Wheeling when a 50c. average sells at $1.85 f. o. b. Chicago. This is a low figure, but probably stiffer prices may be expected soon. Jobbing prices are $1.95@$2 for small lots. Wire nails are stronger. Orders are given freely, and factory rates are now $2.40 only for prompt shipment. Dealers quote $2.50@$2.55.

Steel Rails.—An improved demand is noted for steel rails for spring delivery, which it is thought will be heavy, and a full winter's work may be said to be assured to our local mills. Prices continue at $31.50@$32.50, with a probability of concession from these figures for round lots.

Railway Track Supplies.—Repair material of all kinds is in good request and prices are steady. Spikes have advanced and some scarcity is noticed moderately fair for repair material. Prices are: Iron fish plates, $2.15@$2.20; steel fish plates, $2.25@$2.30; bolts, square nuts, $3@$3.05; hexagon nuts, $3.10@$3.15; spikes, $2.20@$2.25, according to quantity.

Scrap Iron.—Demand is very light; the best wrought grades are selling fairly well, but all others are very quiet. We quote as follows: Country mixed scrap, $15.50@$16.50, according to condition; No. 1 mill, $14@$14.50; light wrought, $9@$9.50; horseshoes, $19@$19.50; axles, $26; cast machinery, $13@$14; stove plates, $9.50@$10; borings, $9.50@$10; wrought turnings, $13.50; No. 1 railroad shop or forge, $21.50; track scrap, $19.50@$20.

Old Wheels and Rails.—Business is limited and prices easier. Old iron rails are held at $25@$25.50 f.o.b. Chicago; steel rails are steady at $19@$20, according to condition; guards and frogs, $17.50@$18.50; old car wheels remain quiet at $19@$19.50. One sale of 300 tons is reported at $19.25 cash.

Louisville. Nov. 12.

[Special Report by Messrs. Hall Bros. & Co.]

The week under review has been less active than the week preceding, though there have been orders entered for early delivery ranging from car loads to 500 tons of soft, mottled and silvery irons, principally at low prices. Some orders for No. 2 foundry have been entered for three and four months' delivery at full market figures. Inquiries exceed the offerings by a considerable amount. The Congressional election has doubtless caused buying to be less active than it would have been otherwise, and it is predicted that buying will revive, and prices will advance sharply soon. Some furnaces have advanced prices, and standard irons are held firm. We quote strong as last:

Hot Blast Foundry Irons.—Southern coke, No. 1, $15@$15.25; No. 2, $14.25@$14.50; No. 3, $14@$14.25. Mahoning Valley, lake ore mixture, $17.75@$18.75; Southern charcoal, No. 1, $17@$17.50; No. 2, $16.50@$17. Missouri charcoal, No 1, $18@$18.50; No. 2, $17@$17.50.

Forge Irons.—Neutral coke, $13.75@$14; cold short, $13.75@$14; mottled, $12.75@$13.25.

Car Wheel and Malleable Irons.—Southern, standard brands, $22@$23; other brands, $18@$19. Lake Superior, $22.50@$23.

Philadelphia. Nov. 14.

(From our Special Correspondent.)

Pig Iron.—More or less comment of a discouraging nature is heard in nearly all iron circles, although inquiry shows that it has little justification. Perhaps there has been fewer contracts closed for winter iron, but the trade conditions have not changed. There is only one thing likely to weaken pig iron prices in this market, viz., the urgent need which a number of makers have for cash. Large buyers have already begun to sound the ground, and are watching for chances. The financial flurry has not as yet affected our market directly or indirectly. Moderate offerings of both Northern and Southern iron continue to be made at $17@$18.50 for No. 1; $16@$17 for No. 2, and $14.50@$15.50 for mill brands. Bessemer, $18@$18.50.

Foreign Material.—Selling prices: $30.50 for spiegel; ferro-manganese, $68.

Muck Bars.—Buyers are waiting for makers to let them in at $29.50.

Merchant Iron.—Cases have occured where iron sold two dollars per ton under last week's selling prices. New business has not come in freely, but mills are all right, and prices range from 1·75@1·95.

Nails.—The low prices are keeping up a fair demand at 1·75@1·90. Factories are quite busy.

Skelp Iron.—Quotations are a little lower. Business was done to-day at 1·95, and one buyer offers 1·90 and expects to be accepted. Sheared has also weakened.

Sheet Iron.—Best refined is selling very well in small lots. Large winter lots could be secured on more favorable terms than for months. Card rates hold, and a good deal of work is in sight. Buyers have said all along that heavy winter orders will not be placed at the extreme full quotations.

Plate and Tank.—Manufacturers in some instances manifest an anxiety for some of the large orders that have recently been sighted by mill agents. Buyers are taking advantage of some unfavorable commercial and financial features and conditions to crowd down prices, but as yet quotations havenot been broken from on small orders.

Structural Material.—The absence of orders and the absence of inquiries does not signify weakness, but there is some anxiety among manufacturers. For some time foreign makers have been figuring on American business, and certain large buyers are waiting to see what can be done in foreign markets.

Steel Billets.—Prices have weakened a little more on account of recently developed outside competition. Billets are $30; nail slabs, $29.50; $29 offered.

Steel Rails.—A large amount of business is hanging in the balance, so to speak. Quotation, $29 and $30. Offers are coming on at $28 and $29. The shaking up in railroad circles will, in the opinion of our local sages, work out good results for railway building in the near future.

Old Rails.—Rails are wanted at $25.50 at seaboard.

Scrap.—Buyers are anxious to a great deal at certain figures. Railroad is held at $23.

Pittsburg. Nov. 13.

(From our Special Correspondent.)

Raw Iron and Steel.—The past week shows no improvement in values. The unsettled condition of the money market and the stock excitement in New York has to a certain extent interfered with business. Negotiations were pending for several large blocks of Bessemer pig; it was expected that the deal would have been closed in time for this report. The unsettled condition of affairs above noted have caused a postponement at least for the present; consumption continues on a very large scale, exceeding all previous records.

As the matter now stands the consumption of iron is entirely too heavy to permit of any marked decline. While on the other hand the production of mills and furnaces are so heavy that any marked advance in prices would be out of the question. As usual the disturbing element in the pig iron trade is the competition of new furnaces that are striving to secure a market for their product. It is this, rather than any surplus of iron, that keeps the pig iron market in a state of constant vibration. A well informed iron man has this to say:

"The absorption of the Allegheny Bessemer Steel Company by the Carnegies is likely to develop very important results as regards the steel trade, as it removes an important element of discord in that department of trade. It is also intimated that a similar consolidation of interests is about being arranged between other companies, who for a long time have been doing what the trade calls cutting each other's throats. This, of course, does not increase the volume of business, but what there is of it will be done with better results financially than was possible under old conditions. It may be a little premature, perhaps, to regard these matters as definitely closed, but there is at least good grounds for believing that it is only a matter of a short time before the announcement is made."

The coke troubles pending at date of our last report have been satisfactorily settled; the men, instead of striking, continued work while the differences were being arbitrated, and no time was lost. The fuel question is causing a good deal of anxiety among iron men. Many experiments are being tried, while others are returning to coal. Public confidence in Philadelphia Gas Company's stock may be gauged by the fact that the stock, the par value of which is $50, sold down to $22.25.

The following sales will give the reader the necessary information:

Coke Smelted Lake and Native Ores.

2,000 Tons Bessemer, Jan, Feb	17.00 cash.
2,000 Tons Grey Forge	15.00 cash.
2,000 Tons Bessemer, Jan., Feb., March	17.25 cash.
1,500 Tons Bessemer, Jan., Feb., March	17.10 cash.
1,500 Tons Grey Forge	15.00 cash.
1,200 Tons Grey Forge, No. 4	14.85 cash.
1,000 Tons Grey Forge, No. 4	14.75 cash.
1,000 Tons Bessemer, City Furnace	17.25 cash.
1,000 Tons Grey Forge	15.00 cash.
1,000 Tons Bessemer	17.10 cash.
1,000 Tons Grey Forge	15.00 cash.
1,000 Tons Grey Forge	15.00 cash.
500 Tons Grey Forge	15.00 cash.
500 Tons Grey Forge	15.00 cash.
300 Tons Grey Forge	15.00 cash.
200 Tons No. 2 Foundry	16.00 cash.
150 Tons No. 1 Foundry	17.00 cash.
100 Tons No. 2 Foundry	16.00 cash.
100 Tons Silvery	17.00 cash.

Muck Bar.

2,000 Tons Neutral, Jan'y and July,	30.75 cash.
1,500 Tons Neutral, December, January and February	31.00 cash.
1,000 Tons Neutral, December and January	31.00 cash.
1,000 Tons Neutral, January, February and March, 1891	31.25 cash.

1000 Tons Neutral, January, February and March, 1891 ..... 31.25 cash.

Steel Slabs and Billets.

7,500 Tons Billets, January, February and March ..... 28.00 cash.

1,500 Tons rod Billets, November and December ..... 27.50 cash.

1,500 Tons Billets, December and January .... 28 00 cash.

750 Tons Nail Slabs ..... 27.50 cash.

Skelp Iron.

700 Tons Sheared Iron ..... 2.30 4 m.

500 Tons Wide Grooved ..... 2.00 4 m.

300 Tons Narrow Grooved ..... 1.95 4 m.

Ferro-Manganese.

90 Tons 80 per cent., Baltimore ..... 68.00 cash.

50 Tons 80 per cent., Pittsburgh ..... 72.00 cash.

Bloom Ends.

500 Tons Bloom Ends, December ..... 18.50 cash.

Charcoal.

600 Tons Missouri Mill Iron ..... 18.00 cash.

250 Tons No. 2 Foundry ..... 22.00 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 14.

Heavy Chemicals.—Consumers who have been stocking up largely during the past month have so far had no occasion to regret their action, as prices remain firm, and manufacturers find plenty of outlet at quoted prices. It is presumed that consumers will continue to buy while present rates prevail, in the expectation that the effect of the English combination will be to increase prices here in the near future. However, stocks are not so considerable that in the event of prices maintaining their present position there will be any occasion for manufacturers to restrict their production. Consumption is increasing at a healthy rate, and a fair stock of chemicals is not a bad thing to have on hand, under the circumstances. It is significant that in all the branches and despite recent heavy buying, manufacturers decline to come down one jot or tittle from their demands.

Caustic Soda.—Stocks are not accumulating, albeit the article is quiet, with a fair demand for consumption. There is an entire absence of speculation with regard to future possibilities. Quotations are: For 70-74 per cent., 3·12½@3·17½c., and the same price for 74-76 per cent.

Carbonated Soda Ash.—We quote the 48 per cent. at 1·57½@1·62½c. and 58 per cent., 1·57½@1.60c.

Caustic soda ash is 1·60@1·62½c. Alkali, 58 per cent., 1·50@1·55c.

Sal soda is quiet at 1·15@1·17½c.

Bleaching powder is scarce and higher, with a good demand at current rates. Quotations are 1·70@1·75, according to brand.

Acids.—While the tone of the market remains unchanged, the atmosphere is thick with rumors that may affect it for good or evil if the events prophesied should materialize. The rumor of the greatest portent is, as usual with rumors in this market, one which concerns the Knickerbocker Chemical Company. Some one is evidently getting tired, and the outside manufacturers claim that they are yet full of vigor and eager for the war.

It is known that the Knickerbocker Chemical Company has had under consideration for the past two months a plan that, panacea-like, will cure the troubles which now exist in the acid market. It declines to give the slightest information anent the scheme, but it is easy to see that its efforts, well meant though they *may* be, will bring about no change.

Prices remain unchanged and we continue to quote, acid per 100 pounds in New York and vicinity: Acetic, $1.72½@$2.20; muriatic, 18-degree, 90c@$1.20; muriatic, 20-degree, 95c.@$1.50; muriatic, 22-degree, $1@$1.75; nitric, 36-degree, $3@$3.25; nitric, 40-degree, $3.50@$4.50; nitric, 42-degree, $4@$4.75; sulgphuric, 60-degree, 70@80c., and sulphuric, 66-deree, 80@95c.

Fertilizing Chemicals.—Business has fallen off somewhat in this market, but prices show no change over last week. High grade dried blood, $1.80@$1.85. For the low grade the price is $1.70@$1.75. Azotine, $1.85@$1.90. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $19@$20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.25@$18.75. Fish scrap, $19@$19.50 per ton f.o.b. factory. Sulphate of ammonia, prime gas liquor, $3.25; prime bone liquor, $3.10@$3.15, with a very good market. Concentrated tankage, $1.67½@$1.70. Refuse, bone black, guaranteed 70 per cent. phosphate, $17@$17.50 per ton. Dissolved bone black is nominally 95c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $7@$7.50 per ton; kiln-dried, $7 per ton; f. o. b. vessels and cars, $7.25@$7.75, according to time of delivery. Freights by sail from Charleston to New York, $2.75@$3 per ton. Charleston rock, ground, $11.75@$12.25, ex-vessel at New York.

Sulphate of potash 48 to 52 per cent. is quoted at $1.12½ per 100 pounds; manure salts, high grade, basis 90 per cent., $2.05 per 100 pounds.

Mr. Paul C. Trenholm, of Charleston, S. C., sends us the following interesting statistics showing shipments of phosphate rock from Charleston S. C., for October, 1888, 1889, and 1890: In 1888, crude, 19,853 tons; ground, 172 tons. In 1889, crude, 15,776 tons. In 1890, crude, 22,016 tons.

Kainit.—Not much is doing in kainit which is quoted at $9.75 for invoice weight, and $10 for actual weight.

Muriate of Potash.—Arrivals during the week aggregated some 1,550 tons, and within the next 20 days 5,000 tons are due at the various ports. The fall trade has set, and this explains the recent heavy trading. Prices will remain the same for the rest of this year, *i. e.*, $1.77½@$1.82½. For next year, on contracts signed prior to November 20th, 1890, prices will be. $1.77½ for New York; $1.75 for Philadelphia; $1.75@$1.77½ for Southern ports and $1.80 for Gulf ports. After the date given the advance will be from 2½@5 cents.

Brimstone.—There is a strong market in brimstone, and not much of a spot stock. Spot quotations are $25 for best unmixed seconds, and $24.50 for best unmixed thirds. For goods to arrive, one dollar less.

Nitrate of Soda.—The spot supply is small, and quotations are $1.80.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Nov. 14.

Brick.—There is a good demand for the various kinds of bricks, and an unusually good supply, the accumulation footing up fully 4,000,000. Prices in consequence of the large stock are not higher, and quotations for the week are: Haverstraw, $5.75@$6.25 per thousand; Uprivers, $5@$5.75; Jerseys, $4.50@$5.75.

Lime.—There has been a fair amount of arrivals, just about enough to keep up with the supply. The unfavorable weather of the early part of the week under review seems to have had a quieting effect on consumers, who have shown no inclination to buy much lime. Shipments for the balance of the year will be very moderate. Several of the smaller vessels of the lime fleet have already laid up for the winter. Many of the larger ships have gone, or are going, down South, and the carrying capacity of the fleet has necessarily been much decreased. Freights from Rockland, Rockport and Thomaston have been 20 cents per barrel, due to the demand during the summer for vessels for ice and for stone. Current quotations are: Rockland lime, common, 90c., and finishing, $1.10; St. John, common and finishing, 80@90c.; Glen Falls, common and finishing, 90c.@$1.10.

Cement.—Business, considering the lateness of the season, is quite good. Canals close this week and arrivals hereafter will be light. Prices, on the whole, are unchanged. We quote: Rosendale, $1@$1.10; Portland, American, $2.25@$2.50; foreign, $2.35@$2.75; special brands, $2.60@$2.85; Roman, $2.80@$3; Keene's coarse, $4.50@$5.50; Keene's fine, $7.25@$8.50 per barrel.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM NOVEMBER 1 TO NOVEMBER 8 AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co.		372
Hendricks Bros.		50
La Marche's Sons, H.		5
Lewisohn Bros.		150
Meyer, G. A. & E.		9
Milne & Co.		74
Muller, Schall & Co.		123
Total		783
Corres. date, 1889.		685

Pig Lead.	Lbs.	Lbs.
Amer. Metal Co.		460
Bruce & Cook		25
Caswell, E. A.		211
Hendricks Bros.		150
Hooper, B. F.	100	100
Naylor & Co.		10
Paulsen, Wm.		350
Schultz & Co., A.		98
Sheldon, G. W.		149
Tatham Bros.	100	100
Total	200	1,653
Corres. date, 1889.		251

Tin.	Tons.	Tons.
Abbot, Jere, & Co.		225
Amer. Metal Co.	150	2,906
Bidwell & French.	120	1,380
Bruce & Cook		20
Carter, Hawley & Co		80
Cohen & Co., A.		20
Cohen, H.		20
Cort & Co., N. L.	25	175
Crooke Smelting & Ref. Co		6
Crooks & Co., R.		85
Davol & Son		49
Hendricks Bros.	10	62
Knauth & Kuhne		10
Lehmaier, S., & Co.	3	175
Lewisohn Bros.		120
Merchant & Co		80
Muller, Schall & Co.		1,000
Naylor & Co.		1,555
Nissen, Geo		10
Phelps, Dodge & Co.		3,596
Pope, Thos. J. Sons		10
Schultz & R.	25	75
Thomson, A. A. & Co.		80
Thomson, D. & Co.		107
Tompkins, Geo. V.		10
Townsend, & Co., J. R.		50
Trotter & Co, N.		75
Total	333	11,781
Corres. date, 1889.		9,526

Tin Plates.	Boxes.	Boxes.
Adams & West'ke Co.		70
Bruce & Cook	4,386	123,605
Byrne & Son		1,060
Central Stamp. Co.		57,294
Coddington & Co.	1,884	136,911
Cohn & Co		17,647
Con. Fruit Jar Co.		120
Corbiere F. & Co.		7,902
Cort & Co.	6,726	203,250
Crooks & Co.	2,242	91,359
De Milt & Co., H. R.	301	13,064
Dickerson, V. D. & Co	9,777	331,699
Fenton, D. E.		4,491
Haberman, F.		66
Herring, Chas. E.		1,000
Iron Clad Mfg. Co.		597
Lalance & G. M. Co.		9,118
Lazard Bros.		1,048
Lehmaier, Schw'z & Co.		200
Merchant & Co.		28,045
Mersick & Co.	300	12,207
Morewood & Co.		40,739
Newell Bros.		416
Payne, S. H. & Co.		934
Pratt Mfg. Co.		95,271
Phelps, Dodge & Co	2,660	718,515
Schneider & Co., J.		3,365
Shepard & Co., S.	243	15,927
Shepherd & Co., W.		200
Standard Oil Co.	2,780	28,843
Taylor, N. & G.		1,429
Thomson & Co., A. A.	1,867	96,226
Warren, J. M		4,868
Wheeler & Co.	1,363	30,639
Whittemore & Co.	684	15,202
Wolff & Reesing		2,077
Wright, Peter & Co.		227
Total	35,213	2,098,571
Corres. date, 1889.	61,523	1,995,171

Pig Iron.	Tons.	Tons.
Abbott & Co., Jere		250
Baldwin & Co., A.		807
Baldwin Bros. & Co.		170
Crocker Bros.		1,515
Crooks & Co., R.		5
Dana & Co.		150
Drummond & Co		600
Geisenheimer & Co		76
Hagermeyer & Brun		30
Henderson Bros.		330
Irvin. R. I. & Co		400
Lillienberg, N.		2,409
Naylor & Co.		150
Perry & Reyer		53
Pierson & Co.		30
Sheldon, G. W. & Co.		200
Stetsson & Co., G. W.		2,725
Williamson, J. & Co.		1,850
Total		11,750
Corres. date, 1889.	500	28,366

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Abbott & Co.		233
Baldwin Bros. & Co.		2
Dana & Co.		1,670
Dolge & Co., A.		1
Downing, R. F. & Co.		109
Henderson Bros.		1
Holt & Co., H. N.		4
Martin & Co		80
Milne, A., & Co.		225
Naylor & Co.		2,948
Pope, Jas. E., Jr.		61
Richards & Co., C. B.		1
Roebling's Sons, J. A.		2,074
Ward & Co., J. C.		198
Wolff, & Co., R. H.		60
Total		7,667
Corres. date, 1889.	51	23,165

Bar Iron.	Tons.	Tons.
Abbott & Co., Jere.		921
Bacon & Co.		1,319
Crocker Bros.		77
Dickerson, Van Dusen & Co.		6
Downing & Co.		285
E. J. Jacobus.		104
Fuller, Dana & Fitz.		11
Holt, H. N.		230
Lilienberg, N.		556
Lundberg, G.		2,602
Milne & Co.		1,189
Muller, Schall & Co.		304
Naylor & Co.	269	1,123
Page, Newell & Co.		1,855
Plenty, J		14
Wilson, J. G.		3
Total	269	10,599
Corres. date, 1889.		8,909

Scrap Iron.	Tons.	Tons.
Baldwin Bros. & Co.		7
Crossman & Co., W. H.		30
Frankfort, M.		347
Leary, D.		27
McDougall & Potter		92
Muller, Schall & Co		18
Pierson, C. L.		101
Samper & Co., S.		186
Stevens, Corvin & Co.		30
Ward, J. E. & Co.		737
Total		1,575
Corres. date, 1889.	125	3,456

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co.		9,508
American S. Co.	100	865
Bacon & Co.		546
Bunnell & Co., J. H.		50
Carey & Moen.	23	569
Cooper, Hewitt & Co.		371
Dana & Co.		1,196
Dodge & Co., A.		3
Downing & Co.		129
Galpin, S. A.		1,241
Greely & Co., E. S.		35
Hazard Mfg. Co		536
Holt & Co., H. N.		3
Jacobus, E. Y.		8
Lee, James & Co.		1,752
Lillienberg, N.		300
Lundberg, G.		157
Lundell, C. G		5
Milne & Co.		1,945
Muller, Schall & Co.		850
Naylor & Co.	318	7,321
Page, Newell & Co.	50	1,702
Roebling's Sons, J. A.		2,687
Sanderson & Son		1
Schulze & R.		1
Taylor, N. L.		16
Temple & Lockw'd		6
Wallace, W.		5
Wessel & Co.		21
Wiebusch & Ho.		4
Wood & Niebuhr.		25
Wolf & Co., R. H.		3,409
Total	491	35,267
Corres. date, 1889.	2,238	41,403

Old Rails.	Tons.	Tons.
Bowring & Archibald		340
Dana & Co.		779
Frankfort, M.		9,013
Henderson Bros.		300
Hernsheim, L.		350
Mosle Bros.		123
Naylor & Co.		3,099
Sawyer, Wallace & Co.		610
West, H.		398
Wiechers, J. F.		600
Total		15,612
Corres. date, 1889.		10,609

Spiegeleisen.	Tons.	Tons.
Abbott, Jere & Co.		2,725
American Metal Co.		100
Blakely & McLellan		1,684
Crocker Bros	749	24,026
Crooks & Co. R.		106
Dana & Co.		15,950
Foley, F.		50
Geisenheimer & Co.		858
Henderson Bros. & Co.		14
Hernsheim, L.		20,902
Holt, H. N.		200
Ivin & Co., R. I.		50
Naylor & Co.		13,158
Perkins, C. L.		1,452
Sachs & Richmond.		2
Whittemore, H. & Co.		95
Total	749	81,372
Corres. date, 1889.	1,681	71,700

Iron Ore.	Tons.	Tons.
Baiz, Jacob		67
Bergen Point Chemical Co.		3,350
Bowring & Archibald		5,292
Earnshaw, A.		3,674
Ennis, Andrew		438
Flores & Co., R. de		14,143
Hill, Frank		700
Johnson & Co., L.		5,030
Total		32,694
Corres. date, 1889.		9,436

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere.		2,545,103
Amer. Met. Co., Le.		940,385
Barber & Co		13,750
Belmont, Aug. & Co		1,763,974
Boker, C. F.		117,000
Burgass & Co		227,290
French, Edye & Co.		135,374
Heidelbach, Sicheimer & Co		672,608
Lewisohn Bros.		251,478
Muller, Schall & Co.		16,250
Paulsen, Wm.		50,000
Sawyer, W'l'ce & Co.		22,796
Seamen, S. H.		66,950
Ward, J. E. & Co.		100,000
Wiechers, J. F		29,97"
Wil'ms & T'hune.		112,000
Total		7,029,939
Corre. date, 1889.	392,650	12,362,985

Copper Matte.	
American Metal Co	3,072,079
Lewisohn Bros.	20,439,662
Nichols, Geo. H.	257,202
Paulsen, Wm.	1,039,428
Wil'ms & T'hune.	2,848,706
Total	27,667,077
Corres. date 1889.	1,517,867 31,209,336

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and Amount of last			Dividends. Total paid.	Date & amount of last.		
1	Adams, S. L.	Colo.	$1,500,000	150,000	$10	*	.....	..	.....	$555,000	Jan..	1887	.10
2	Alice, S. C.	Mont.	10,000,000	400,000	25	*	.....	..	.....	850,000	July.	1890	.06½
3	Alma&Nel Wood C.,S	Idaho	300,000	30,000	10	*	.....	..	.....	60,000	Jan..	1889	.50
4	American & Nettie,C.	Colo.	.....	300,000	.....	.....	.....	..	.....	150,000	Nov..	1889	.10
5	Amy & Silversmith,S.	Mont.	.....	341,419	.....	.....	.....	..	.....	247,530	Aug..	1887	.12½
6	Atlantic, C.	Mich.	1,000,000	40,000	25	$280,000	April	1875	$1.00	660,000	Aug..	1890	1.00
7	Argenta, S.	Nev.	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb..	1880	.20
8	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10	*	.....	..	.....	540,000	Nov.	1890	.10
9	Aurora, I.	Mich.	2,000,000	100,000	20	.....	.....	..	.....	155,000	Oct.	1887	1.87½
10	Badger, S.	Ont.	250,000	50,000	5	.....	.....	..	.....	37,500	Mar.	1890	.25
11	Bassick, G. S.	Colo.	10,000,000	100,000	100	*	.....	..	.....	400,000	Mar.	1884	1.00
12	Belle Isle, S.	Nev.	10,000,000	100,000	100	190,000	Dec.	1889	.15	300,000	Dec.	1879	.25
13	Belcher, G. S.	Nev.	10,400,000	104,000	100	2,978,000	June	1890	.50	15,397,000	April	1876	1.00
14	Bellevue, Idaho, S. L.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	300,000	Jan..	1887	.10
15	Bi-Metallic, S.	Mont.	5,000,000	200,000	25	.....	.....	..	.....	270,000	Nov..	1890	.35
16	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	575,000	Nov..	1889	.25	1,662,572	April	1885	.50
17	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*	.....	..	.....	520,000	June	1886	1.15
18	Boston & Mont., C. S.	Mont.	2,500,000	100,000	25	*	.....	..	.....	1,450,000	Aug.	1890	.50
19	Breece, S.	Colo.	5,000,000	200,000	25	*	.....	..	.....	2,000	Feb.	1880	.01
20	Brooklyn Lead, L. S.	Utah	500,000	50,000	10	.....	.....	..	.....	127,000	July.	1887	.05
21	Bulwer, G.	Cal.	10,000,000	100,000	10	130,000	Aug..	1889	.25	175,000	Jan..	1884	.10
22	Bunker Hill & Sull.	Idaho	3,000,000	300,000	10	*	.....	..	.....	150,000	Oct.	1883	.06⅔
23	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May.	1885	.15	194,000	Oct.	1890	.08
24	Calliope, S.	Colo.	1,000,000	1,000,000	.....	.....	.....	..	.....	90,000	April	1890	.01
25	Calumet & Hecla, C.	Mich.	2,500,000	100,000	25	1,200,000	.....	..	.....	34,350,000	May.	1890	5.00
26	Carbonate Hill, S. L.	Colo.	1,500,000	200,000	10	*	.....	..	.....	80,000	April	1884	.05
27	Carlisle, G.	N. M.	1,000,000	200,000	5	.....	.....	..	.....	175,000	Dec.	1888	.12½
28	Castle Creek, G.	Idaho	100,000	100,000	1	.....	.....	..	.....	51,000	Oct.	1883	.03
29	Catalpa, S. L.	Colo.	3,000,000	300,000	10	*	.....	..	.....	270,000	May.	1884	.10
30	Central, C.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,950,000	Feb.	1890	1.00
31	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*	.....	..	.....	1,650,000	Dec.	1884	.25
32	Colorado Central,S.L.	Colo.	2,750,000	275,000	10	*	.....	..	.....	406,250	Aug.	1889	.05
33	Commonwealth, S.	Nev.	10,000,000	100,000	100	170,000	Nov..	1888	.50	20,000	Nov..	1890	.20
34	Confidence, S. L.	Nev.	.....	24,960	..	328,880	May.	1890	.75	199,680	April	1889	1.00
35	Cons. Cal. & Va., G. S.	Nev.	21,600,000	216,000	100	108,000	Jan..	1885	.20	3,466,800	April	1890	.25
36	Contention, S.	Ariz.	12,500,000	250,000	50	.....	.....	..	.....	12,587,500	Dec.	1884	.25
37	**Cop. Queen Con., C.	Ariz.	1,400,000	140,000	10	.....	.....	..	.....	210,000	Feb.	1889	.50
38	Crescent, S. L. G.	Utah	15,000,000	600,000	25	*	.....	..	.....	228,000	Oct.	1888	.03
39	Crown Point, G. S.	Nev.	10,000,000	100,000	160	2,425,000	Sept.	1889	.50	11,588,000	Jan.	1875	2.00
40	Daly, S. L.	Utah	3,000,000	150,000	20	*	.....	..	.....	1,669,000	Oct.	1890	.25
41	Deer Creek, S. G.	Idaho	1,000,000	200,000	5	*	.....	..	.....	20,000	June	1889	.05
42	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*	.....	..	.....	11,000,000	Nov..	1887	.10
43	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	240,300	Oct.	1884	.10
44	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*	.....	..	.....	380,000	Oct.	1889	.05
45	Dunstone, G. S. L.	Mont.	1,000,000	200,000	5	*	.....	..	.....	6,000	Nov..	1888	.03
46	Eclipse	Colo.	100,000	100,000	1	.....	.....	..	.....	20,000	Nov..	1887	.10
47	Elkhorn, G. S.	Mont.	1,000,000	100,000	10	50,000	July.	1883	.50	850,000	July.	1887	.05
48	Empire Lt., G.	Mont.	500,000	100,000	5	.....	.....	..	.....	70,500	Oct.	1887	.37½
49	Eureka Con., G. S. L.	Nev.	5,000,000	50,000	100	550,000	June	1889	.50	4,892,850	Oct.	1890	.25
50	Evening Star, S. L.	Colo.	500,000	50,000	10	*	.....	..	.....	1,458,500	Dec.	1889	.25
51	Excelsior, G.	Cal.	10,000,000	100,000	100	560,000	Sept.	1885	1.00	875,000	Oct.	1890	.25
52	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov..	1878	1.00	1,125,000	Dec.	1885	.20
53	Franklin, C.	Mich.	1,000,000	40,000	25	220,000	June	1871	.....	960,000	Jan..	1889	2.00
54	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*	.....	..	.....	190,000	July.	1886	.10
55	Garfield Lt., G. S.	Nev.	500,000	100,000	5	.....	.....	..	.....	95,000	April	1886	.12½
56	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	3,388,800	Sept.	1890	.25	2,826,000	Oct.	1870	10.00
57	Grand Prize, S.	Nev.	10,000,000	100,000	100	785,000	Jan..	1890	.30	525,000	Jan..	1890	.36
58	Granite, S. L.	Idaho	500,000	500,000	1	*	.....	..	.....	28,400	Oct.	1889	.02
59	Granite Mountain, S.	Mont.	10,000,000	400,000	25	*	.....	..	.....	9,200,000	July.	1890	.50
60	Green Mountain, G.	Cal.	1,250,000	125,000	10	*	.....	..	.....	212,000	Nov..	1881	.07½
61	Hale & Norcross, G. S.	Nev.	11,200,000	112,000	100	5,142,800	April	1890	.50	1,162,000	July.	1888	.50
62	Hecla Con., S. G. L. C.	Mont.	1,500,000	30,000	50	.....	.....	..	.....	1,500,000	April	1889	.50
63	Hel'a Mg.& Red,G.S.L.	Mont.	3,315,000	663,000	5	*	.....	..	.....	197,579	July.	1886	.06
64	Holmes, S.	Nev.	10,000,000	100,000	100	370,000	May.	1890	.25	75,000	April	1886	.25
65	Holyoke, G.	Idaho	200,000	200,000	1	.....	.....	..	.....	27,000	Feb.	1883	.10
66	Homestake, G.	Dak.	12,500,000	125,000	100	300,000	July.	1878	1.00	5,563,750	Oct.	1890	.10
67	Honorine, S. L.	Utah	500,000	250,000	2	37,500	April	1889	.05	125,000	Sept.	1887	.05
68	Hope, S.	Mont.	1,000,000	100,000	10	*	.....	..	.....	238,252	April	1888	.25
69	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*	.....	..	.....	4,150,000	June	1890	.12½
70	Hubert, G.	Colo.	1,000,000	1,000,000	1	*	.....	..	.....	247,000	Dec.	1889	.00½
71	Idaho, G.	Cal.	310,000	3,100	100	.....	.....	..	.....	5,235,900	Dec.	1889	5.00
72	Ideal, S. L.	Colo.	1,500,000	50,000	10	.....	.....	..	.....	15,000	Oct.	1886	.05
73	Illinois, S.	N. M.	100,000	100,000	1	*	.....	..	.....	45,000	April	1889	.20
74	Independence, S.	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept.	1879	.25
75	Iron Hill, S.	Dak.	2,500,000	250,000	10	134,000	July.	1889	.03	156,250	Nov.	1887	.07½
76	Iron-Silver, S. L.	Colo.	10,000,000	500,000	20	*	.....	..	.....	2,500,000	April	1889	.20
77	Jackson, G. S.	Nev.	5,000,000	50,000	100	237,500	Nov..	1880	.20	55,000	June	1889	.10
78	Jay Gould.	Mont.	2,000,000	40,000	5	*	.....	..	.....	459,000	May	1890	.04
79	Jocuistita, L.	Mex.	2,500,000	250,000	10	.....	.....	..	.....	1,200,000	Feb.	1885	.50
80	Jumbo, G.	Colo.	2,000,000	200,000	10	.....	.....	..	.....	35,000	Oct.	1887	.02½
81	Kearsarge, C.	Mich.	1,250,000	50,000	25	190,000	Oct.	1887	1.00	100,000	Jan..	1890	2.00
82	Kentuck.	Nev.	3,000,000	30,000	100	406,930	Aug..	1890	.30	1,350,000	Dec.	1886	.10
83	La Platta, S. L.	Colo.	2,000,000	200,000	10	*	.....	..	.....	610,000	Sept.	1889	.10
84	Leadville Con., S. L.	Colo.	4,000,000	400,000	10	*	.....	..	.....	4,423,000	April	1889	.05
85	Lexington, G. S.	Mont.	4,000,000	40,000	100	*	.....	..	.....	609,000	Jan..	1885	2.00
86	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*	.....	..	.....	820,000	Dec.	1890	.05
87	Little Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	.....	..	.....	1,050,000	Mar.	1890	.50
88	Little Rule	Colo.	500,000	500,000	1	.....	.....	..	.....	30,000	June	1890	.02
89	Mammoth	Utah	10,000,000	400,000	25	.....	.....	..	.....	480,000	Aug.	1890	.10
90	Martin White, S.	Nev.	10,000,000	100,000	100	1,225,000	Oct.	1890	.25	140,000	Aug.	1890	.25
91	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*	.....	..	.....	175,000	May	1888	5.00
92	Matchless, S.	Colo.	500,000	500,000	1	*	.....	..	.....	15,000	Feb.	1890	.00½
93	May Mazeppa	Colo.	1,000,000	100,000	1	.....	.....	..	.....	60,000	Nov..	1890	.01
94	Minnesotta, C.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar.	1876	.....
95	Mono, G.	Cal.	5,000,000	50,000	100	760,000	Sept.	1890	.25	12,500	Mar.	1886	.25
96	Montana, Lt., G. S.	Mont.	3,300,000	660,000	5	*	.....	..	.....	2,489,670	Oct.	1890	.06
97	Morning Star, S. L.	Colo.	1,000,000	100,000	10	.....	.....	..	.....	850,000	Dec.	1889	.20
98	Moulton, S. G.	Mont.	2,000,000	400,000	5	*	.....	..	.....	380,000	Dec.	1887	.07½
99	Mount Pleasant, G.	Cal.	150,000	150,000	1	*	.....	..	.....	150,000	Feb.	1887	.30
100	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	160,000	Oct.	1889	.20
101	Napa, Q.	Cal.	700,000	100,000	7	*	.....	..	.....	380,000	Oct.	1890	.10
102	Navajo, G. S.	Nev.	10,000,000	100,000	100	500,000	April	1890	.15	365,000	April	1889	.10
103	New Guston, S.	Colo.	500,000	100,000	5	*	.....	..	.....	337,500	April	1889	.50
104	N. Hoover Hill, G. S.	N. C.	300,000	12,000	25	*	.....	..	.....	30,000	Dec.	1885	.06½
105	Northern Belle, S.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	April	1883	.50
106	North Belle Isle, S.	Nev.	10,000,000	100,000	100	395,000	April	1890	.20	230,000	May	1888	.50
107	North Star, G.	Cal.	1,000,000	100,000	10	.....	.....	..	.....	250,000	Dec.	1889	.50
108	Ontario, S. L.	Utah	15,000,000	150,000	100	.....	.....	..	.....	11,375,000	Oct.	1890	.10
109	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,210,640	April	1890	.50	1,595,800	July.	1862	1.00
110	Original, S.	Mont.	1,500,000	60,000	25	*	.....	..	.....	123,000	July.	1889	.05
111	Oro	Colo.	500,000	100,000	5	.....	.....	..	.....	60,000	June	1890	.20
112	Osceola, C.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,447,500	Dec.	1890	1.50
113	Oxford, G.	N. S.	125,000	125,000	1	*	.....	..	.....	78,500	Sept.	1888	.02
114	Paradise Valley, G. S.	Nev.	10,000,000	100,000	100	57,000	April	1888	.15	150,000	April	1887	.10
115	Parrot, C.	Mont.	1,800,000	180,000	10	.....	.....	..	.....	696,000	Sept.	1890	.10
116	Peacock, S. G.	N. M.	2,000,000	200,000	10	*	.....	..	.....	60,000	Nov..	1889	.....
117	Plumas Eureka, G.	Cal.	1,406,250	140,625	10	*	.....	..	.....	2,548,046	Oct.	1889	.37½
118	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*	.....	..	.....	20,000	Feb.	1886	.10
119	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*	.....	..	.....	2,280,000	Feb.	1888	.40
120	Quicksilver, pref., Q.	Cal.	4,300,000	43,000	100	.....	.....	..	.....	1,705,791	Aug.	1890	1.50
121	" com., Q.	Cal.	5,700,000	57,000	100	.....	.....	..	.....	643,867	July.	1882	.40
122	Quincy, C.	Mich.	1,000,000	40,000	25	200,000	Dec.	1862	.....	5,570,000	Aug.	1890	5.00
123	Republic, C.	Mich.	5,000,000	100,000	50	400,000	Dec.	1889	.30	4,312,587	June	1887	1.25
124	Richmond, S. L.	Nev.	1,350,000	54,000	25	*	.....	..	.....	99,785	Feb.	1890	.50
125	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar.	1886	.50	585,000	Mar.	1886	.05
126	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*	.....	..	.....	100,000	Dec.	1882	.50
127	Robert E. Lee, S. L.	Colo.	10,000,000	500,000	20	.....	.....	..	.....	4,460,000	July.	1869	3.00
128	Savage, S.	Nev.	11,200,000	112,000	100	6,604,000	Nov..	1889	.50	7,500	April	1883	.01
129	Shoshone, G.	Idaho	150,000	150,000	1	.....	.....	..	.....	1,568,140	April	1888	.12½
130	Sierra Buttes, G.	Cal.	2,225,000	122,500	10	.....	.....	..	.....	102,000	Jan.	1871	1.00
131	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,296,910	May.	1890	.50	270,000	April	1889	.10
132	Sierra Nevada, S. L.	Idaho	1,000,000	1,000,000	1	*	.....	..	.....	40,000	May.	1889	.02
133	Silver Cord, G. S. L.	Colo.	4,500,000	450,000	10	.....	.....	..	.....	270,000	April	1889	.10
134	Silver King, S.	Ariz.	10,000,000	100,000	100	180,000	Sept.	1890	.30	1,980,000	July.	1887	.25
135	Silver Mg. of L. V.	N. M.	500,000	500,000	1	.....	.....	..	.....	250,000	Oct.	1890	.05
136	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*	.....	..	.....	50,000	Jan.	1881	.25
137	Small Hopes Con., S.	Colo.	5,000,000	250,000	20	*	.....	..	.....	3,162,500	Oct.	1890	.25
138	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	3,595,000	June	1888	.05
139	Standard, G. S.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	155,000	Nov	1881	.05
140	Stormont, S.	Utah	500,000	500,000	1	*	.....	..	.....	844,000	Dec.	1887	.20
141	St. Joseph, L.	Mo.	1,500,000	150,000	10	*	.....	..	.....	9,000	April	1888	.02½
142	Swansea, G.	Colo.	600,000	60,000	10	*	.....	..	.....	100,000	Nov	1881	.20
143	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	April	1885	3.00	1,670,000	Oct.	1890	4.00
144	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*	.....	..	.....	1,250,000	April	1882	.10
145	United Verde, C.	Ariz.	3,000,000	300,000	10	*	.....	..	.....	97,500	Feb.	1884	.10
146	Valencia, M.	N. H.	150,000	1,500	100	*	.....	..	.....	41,250	April	1886	2.50
147	Viola Lt., S. L.	Idaho	750,000	150,000	5	.....	.....	..	.....	272,500	Oct.	1887	.37½
148	Ward Con., S. L.	Colo.	2,000,000	200,000	10	.....	.....	..	.....	20,000	Dec.	1889	.05
149	Yankee Girl.	Colo.	2,500,000	250,000	10	.....	.....	..	.....	1,275,000	July.	1887	.10
150	Yellow Jacket, G. S.	Nev.	12,000,000	120,000	100	5,508,000	Mar.	1889	.50	2,148,000	Aug.	1871	1.50
151	Weeb City, L. Z.	Mo.	55,000	11,000	5	.....	.....	..	.....	4,400	July.	1889	.10
152	Woodside	Utah	.....	.....	.....	.....	.....	..	.....	25,000	Oct.	1889	.25
153	Young America	Cal.	.....	.....	.....	.....	.....	..	.....	175,000	.....	1889	.10

NON-DIVIDEND PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	.....	.....	..	.....
2	Allegheny, S.	Colo.	5,000,000	500,000	10	.....	.....	..	.....
3	Altouez, G.	Mich.	2,000,000	80,000	25	$747,000	Jan..	1890	.70
4	Alpha Con., G. S.	Nev.	3,000,000	30,000	100	112,500	Sept.	1890	.25
5	Alta, S.	Nev.	10,080,000	100,800	100	3,359,830	Sept.	1890	.50
6	Amador, G.	Cal.	400,000	200,000	2	*	.....	..	.....
7	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	June	1887	.....
8	Amity, S.	Colo.	250,000	250,000	1	.....	.....	..	.....
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	5	.....	.....	..	.....
10	Astoria, G.	Cal.	200,000	100,000	2	.....	.....	..	.....
11	Barcelona, G.	Nev.	5,000,000	200,000	25	*	.....	..	.....
12	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan..	1883	.10
13	Belmont, S.	Nev.	5,000,000	50,000	100	735,000	April	1886	.10
14	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,279,275	Aug..	1890	.25
15	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*	.....	..	.....
16	Black Oak, G.	Cal.	3,000,000	300,000	10	*	.....	..	.....
17	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov..	1883	.25
18	Bremen, S.	N. M.	5,000,000	500,000	10	*	.....	..	.....
19	Brownlow, S.	Colo.	250,000	250,000	1	.....	.....	..	.....
20	Brunswick, G.	Cal.	2,000,000	400,000	5	*	.....	..	.....
21	Bullion, G. S.	Nev.	10,000,000	100,000	100	2,790,000	Dec.	1889	.25
22	Calaveras, G.	Cal.	500,000	500,000	1	*	.....	..	.....
23	Cactus, G.	Colo.	500,000	100,000	5	*	.....	..	.....
24	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	.....	..	.....
25	Cashier, G. S.	Colo.	500,000	250,000	2	*	.....	..	.....
26	Charles Dickens, G. S.	Idaho	1,250,000	250,000	5	*	.....	..	.....
27	Cherokee, G.	Cal.	1,500,000	150,000	10	.....	.....	..	.....
28	Chollar, S.	Nev.	11,200,000	112,000	100	1,540,000	Nov..	1889	.50
29	Cleveland, T.	Dak.	1,000,000	500,000	2	*	.....	..	.....
30	Cochiti, S.	N. M.	500,000	50,000	10	.....	.....	..	.....
31	Comstock, G. S.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887	.15
32	Con. Imperial, G. S.	Nev.	5,000,000	50,000	100	1,875,000	July.	1890	.05
33	Con. Pacific, G.	Cal.	6,000,000	60,000	100	198,000	June	1890	.10
34	Con. Silver, S.	Mo.	2,500,000	250,000	10	.....	.....	..	.....
35	Crescent, S. L.	Colo.	3,000,000	300,000	10	*	.....	..	.....
36	Crocker, S.	Ariz.	10,000,000	100,000	100	150,000	June	1890	.15
37	Crowell, G.	N. C.	500,000	500,000	1	.....	.....	..	.....
38	Dahlonega, G.	Ga.	250,000	250,000	1	.....	.....	..	.....
39	Dandy, S.	Colo.	5,000,000	500,000	10	.....	.....	..	.....
40	Decatur, S.	Colo.	1,500,000	300,000	5	*	.....	..	.....
41	Denver City, S. L.	Colo.	5,000,000	500,000	10	*	.....	..	.....
42	Denver Gold, G.	Colo.	300,000	60,000	5	.....	.....	..	.....
43	Durango, G.	Colo.	500,000	500,000	1	*	.....	..	.....
44	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	900,000	Mar.	1886	1.00
45	El Cristo, G. S.	U.S.C.	1,000,000	500,000	2	.....	.....	..	.....
46	El Dorado, G.	Cal.	1,000,000	250,000	4	*	.....	..	.....
47	El Talento, G.	U.S.C.	1,000,000	500,000	2	.....	.....	..	.....
48	Empire, S.	Utah	10,000,000	100,000	10	*	.....	..	.....
49	Eureka Tunnel, S. L.	Nev.	10,000,000	100,000	100	*	.....	..	.....
50	Exchequer	Nev.	10,000,000	100,000	100	865,000	July.	1890	.25
51	Found Treasure, G. S.	Nev.	10,000,000	100,000	100	81,500	May.	1890	.25
52	Gogebic I. Syn., I.	Wis.	5,600,000	200,000	25	.....	.....	..	.....
53	Gold Cup, S.	Colo.	500,000	500,000	1	*	.....	..	.....
54	Golden Era, S.	Mont.	2,000,000	200,000	10	*	.....	..	.....
55	Gold Placer, G.	Colo.	5,000,000	200,000	25	222,314	Dec..	1885	.25
56	Gold Rock, G.	Cal.	1,000,000	500,000	2	*	.....	..	.....
57	Goodshaw, G.	Cal.	10,000,000	100,000	100	*	.....	..	.....
58	Grand Belt, C.	Tex.	12,000,000	120,000	100	.....	.....	..	.....
59	Grand Duke	Colo.	800,000	80,000	10	.....	.....	..	.....
60	Great Remance, G.	U.S.C.	1,000,000	500,000	2	*	.....	..	.....
61	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*	.....	..	.....
62	Gregory Con., G.	Mont.	3,000,000	300,000	10	.....	.....	..	.....
63	Harlem M. & M. Co.,G.	Cal.	1,000,000	200,000	5	.....	.....	..	.....
64	Head Cent. & Tr., S. G.	Ariz.	10,000,000	100,000	100	.....	.....	..	.....
65	Hector, G.	Cal.	1,500,000	300,000	5	45,000	Jan..	1889	.15
66	Highland, C.	Mich.	500,000	25,000	20	.....	.....	..	.....
67	Holywood	Cal.	200,000	100,000	2	.....	.....	..	.....
68	Hortense, S.	Colo.	2,000,000	200,000	10	.....	.....	..	.....
69	Huron, C.	Mich.	1,000,000	40,000	25	230,000	May.	1887	3.00
70	Iron, Gold & Silver, S.	N. M.	2,000,000	200,000	10	*	.....	..	.....
71	Ironton, I.	Wis.	1,000,000	40,000	25	.....	.....	..	.....
72	Iroquois, C.	Mich.	1,250,000	50,000	25	.....	.....	..	.....
73	J. D. Reymert	Ariz.	10,000,000	100,000	100	.....	.....	..	.....
74	Julia Con., G. S.	Nev.	11,000,000	110,000	100	1,463,000	Jan..	1889	.10
75	Lacrosse, G.	Colo.	1,000,000	100,000	10	*	.....	..	.....
76	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*	.....	..	.....
77	Mayflower Gravel.	Cal.	1,000,000	100,000	10	585,000	Mar.	1890	.56
78	Medora, G.	Dak.	250,000	250,000	1	.....	.....	..	.....
79	Mexican, G. S.	Nev.	10,000,000

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Nov. 8. H.	Nov. 8. L.	Nov. 10. H.	Nov. 10. L.	Nov. 11. H.	Nov. 11. L.	Nov. 12. H.	Nov. 12. L.	Nov. 13. H.	Nov. 13. L.	Nov. 14. H.	Nov. 14. L.	Sales.
Adams, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alice.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Atlantic, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Belcher, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Belle Isle.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bodie Cons., Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bos. & Mont., Mont	....	....	....	....	....	....	....	....	....	....	....	....	.....
Breece, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bulwer, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Caledonia.	....	....	.80	....	....	....	.80	....	.75	....	.76	.75	600
Calumet & Hecla, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Catalpa, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chrysolite, Colo.	.33	....	....	....	....	....	....	....	....	....	....	....	300
Confidence, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Cal. & Va., Nev.	4.00	....	4.00	....	....	....	....	....	3.90	....	....	....	310
Crown Point, Nev.	....	....	....	....	2.20	....	....	....	....	....	....	....	350
Deadwood, Dak.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Dunkin, Colo.	....	....	....	....	....	....	....	....	.65	....	....	....	200
Eureka Con.	....	....	4.00	....	4.00	....	....	....	....	....	....	....	200
Father de Smet, Dak.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Franklin.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Freeland, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Gould & Curry, Nev.	2.30	....	....	....	....	....	....	....	....	....	....	....	100
Hale & Norcross, Nev.	....	....	....	....	2.25	....	....	....	....	....	....	....	200
Holyoke.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Homestake, Dak.	....	....	....	....	9.00	....	....	....	....	....	....	....	100
Horn Silver, Utah.	3.30	3.20	....	....	....	....	....	....	....	....	....	....	850
Independence, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Iron Hill, Dak.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kearsarge.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Leadville C., Colo.	.15	....	....	....	....	....	.15	....	.15	....	....	....	1,700
Little Chief, Colo.	.34	....	....	....	.33	....	.33	....	.35	....	.40	.38	1,500
Mono, Cal.	....	....	.95	....	....	....	....	....	....	....	....	....	400
Moulton, Mont.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mt. Diablo, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Navajo, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Belle Isle, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ontario, Utah.	41.50	....	....	....	41.00	40.75	41.00	....	....	....	....	....	250
Ophir, Nev.	....	....	....	....	....	....	....	....	4.00	....	....	....	100
Osceola, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Plymouth, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Quicksilver, Pref.	....	....	....	....	....	....	41.00	....	....	....	....	....	100
" Com.	....	....	....	....	6.50	6.00	....	....	....	....	....	....	300
Quincy, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Robinson Cons., Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Savage.	....	....	....	....	2.40	....	....	....	2.45	....	....	....	200
Sierra Nevada, Nev.	3.15	....	....	....	2.60	....	2.70	....	....	....	....	....	500
Silver Cord.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver King, Ariz.	....	....	.43	....	.43	.41	....	....	....	....	....	....	400
Silver Mg. of L. V.	1.00	....	....	....	....	....	....	....	....	....	....	....	500
Small Hopes.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Standard.	....	....	....	....	....	....	....	....	....	....	....	....	.....
stormont, Utah.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tamarack, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
yellow Jacket, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Nov. 8. H.	Nov. 8. L.	Nov. 10. H.	Nov. 10. L.	Nov. 11. H.	Nov. 11. L.	Nov. 12. H.	Nov. 12. L.	Nov. 13. H.	Nov. 13. L.	Nov. 14. H.	Nov. 14. L.	Sales.
Alpha, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alta, Nev.	1.55	....	....	....	1.40	....	....	....	....	....	....	....	200
American Flag, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Andes, Nev.	....	....	2.10	....	....	....	....	....	1.95	....	....	....	600
Amador, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Astoria, Cal.	.07	.06	.07	....	.06	....	.06	....	.06	....	.06	....	12,200
Barcelona, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Best & Belcher, Nev.	....	....	....	....	3.00	....	....	....	....	....	....	....	100
Bonanza King, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Brunswick, Cal.	.08	....	.08	.07	.08	.07	.08	....	....	....	.08	....	3,200
Bullion, Nev.	3.35	....	....	....	2.90	....	3.00	....	....	....	....	....	300
Butte & Bost., Mont.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Castle Creek, Idaho.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Choilar, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col. & Beaver, Idaho.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Commonwealth, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Comstock T., Nev.	.16	....	....	....	....	....	....	....	....	....	....	....	100
" bonds.	....	....	....	....	.30	....	....	....	....	....	....	....	500
" scrip.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Con. Imperial, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Pacific, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Crescent, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Denver City, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
El Cristo, Rep. of Col.	.78	....	....	....	....	....	....	....	....	....	....	....	100
Exchequer.	1.45	....	....	....	1.10	....	1.20	....	....	....	....	....	300
Hollywood, Cal.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Huron, Mich.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Julia, Nev.	.39	.35	.37	....	.38	....	.35	....	....	....	....	....	1,600
Justice, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kossuth.	....	....	....	....	....	....	.19	....	....	....	....	....	100
Lacrosse, Colo.	.06	....	....	....	....	....	....	....	....	....	....	....	1,000
Lee Basin, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mexican, Nev.	3.05	....	....	....	3.15	....	2.80	....	2.50	....	....	....	400
Minn. Iron Co.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mutual Sm. & Mg. Co.	1.50	1.45	1.50	....	1.50	....	1.50	....	1.50	....	1.50	....	1,400
Nevada Queen, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Commonwealth, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Occidental, Nev.	....	....	....	....	....	....	....	....	....	....	1.25	....	200
Oriental & Mil., Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Overman, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Phœnix of Ariz.	.72	.70	.70	....	....	....	.77	.75	....	....	....	....	1,100
Phœnix Lead, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Potosi.	....	....	....	....	6.50	....	....	....	6.50	....	....	....	300
Rappahannock, Va.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Santa Fe, Colo.	....	....	....	....	....	....	....	....	....	....	....	....	.....
S. Sebastian.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Scorpion.	.40	....	.40	....	....	....	....	....	....	....	....	....	400
Seg. Belcher, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Queen.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sullivan Con., Dak.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sutro Tunnel, Nev.	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sutter Creek, Cal.	1.15	....	1.15	....	1.15	....	1.15	....	1.15	....	1.15	....	1,300
Union Cons., Nev.	....	....	....	....	....	....	2.40	....	2.30	....	2.45	....	250
Utah, Nev.	1.30	....	....	....	1.05	....	....	....	....	....	....	....	600

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 9,060. Non-dividend shares sold, 31,950. Total, New York, 41,010.

BOSTON MINING STOCK QUOTATIONS.

Name of Company.	Nov. 7.	Nov. 8.	Nov. 10.	Nov. 11.	Nov. 12.	Nov. 13.	Sales.
Atlantic, Mich	15.00	15.50 15.00	15.00	15.00 14.00	16.00 15.50	17.50 16.00	1,851
Bodie, Cal.	....	....	....	....	....	....	.....
Bonanza Development.	.50	.50	.50	.50	.50	.50	3,100
Bost. & Mont., Mont.	47.00	44.75 45.75 44.00	44.50	43.00 44.25	43.50 46.00	43.50 48.00 46.50	9,090
Breece, Colo.	....	....	....	....	....	....	.....
Calumet & Hecla, Mich.	270	267 270 257	267	260 265	240 265	233 275 270	632
Catalpa, Colo.	....	....	....	....	....	....	.....
Central, Mich.	....	....	....	....	....	19.00	20
Chrysolite Colo.	....	....	....	....	....	....	.....
Con. Cal. & Va., Nev.	....	....	....	....	....	....	.....
Dunkin, Colo.	....	.70	.70	.70	....	....	1,000
Eureka, Nev.	....	....	....	....	....	....	.....
Franklin, Mich.	15.50	16.50 16.00	15.00	14.50 15.00	14.50 16.00	15.50 18.00 16.00	1,850
Honorine, Utah.	....	....	....	....	....	....	.....
Horn Silver, Utah.	....	....	....	....	....	....	.....
Kearsarge.	11.00	10.50 11.00	11.00	10.75 11.50	10.75 13.00	.... 15.00 13.50	1,670
Little Chief, Colo.	....	....	....	....	....	....	.....
Little Pittsburg, Colo.	....	....	....	....	....	....	.....
Moulton.	....	....	....	....	....	....	.....
Napa, Cal.	4.25	.... 4.00	....	....	....	....	250
Ontario, Utah.	....	....	....	....	....	....	.....
Osceola, Mich.	35.00	33.63 34.75 33.75	33.50	31.25 31.75	31.00 34.00	33.50 36.50 34.25	6,908
Pewabic, Mich.	....	....	....	....	....	....	.....
Quincy, Mich.	75.00	.... 75.00	77.00	.... 76.00	75.00	.... 102	130
Ridge, Mich.	....	....	....	....	....	.88	500
Sierra Nevada, Nev.	....	....	....	....	....	....	.....
Silver King.	....	....	....	....	....	....	.....
Stormont, Utah.	....	....	....	....	....	....	.....
Tamarack, Mich.	145	142½ 150 148	150	 150	 155	148½ 160 158	778
Tecumseh, Mich.	1.50	....	....	....	....	.... 2.50	150

Name of Company.	Nov. 7.	Nov. 8.	Nov. 10.	Nov. 11.	Nov. 12.	Nov. 13.	Sales.
Allouez, Mich.	4.50	4.25 4.75 4.38	4.50	.... 4.50	4.25 5.00	4.50 6.00 5.00	2,378
Arnold, Mich.	1.05	....	....	....	....	....	100
Aztec, Mich.	....	....	....	....	....	....	.....
Brunswick, Cal.	....	....	....	....	....	....	.....
Butte & Boston, Mont.	16.00	15.50 15.50 15.00	15.00	13.25 13.50	12.25 15.25	14.75 16.50 15.50	2,619
Centennial, Mich.	14.00	12.50	13.00	12.13 12.75	12.00 14.60	13.00 16.50 15.00	2,397
Comstock, T., Nev.	....	....	....	....	....	....	.....
Copper Falls Mg.	....	....	....	....	....	....	.....
Crescent, Colo.	....	....	....	....	....	....	.....
Dana, Mich.	....	....	....	....	....	....	.....
Don Enrique, N. M.	....	....	....	....	....	....	.....
El Cristo, S. A.	....	....	....	....	....	....	.....
Hanover, Mich.	....	....	....	....	....	....	.....
Humboldt, Mich.	....	....	....	....	....	....	.....
Hungarian, Mich.	....	....	....	....	....	....	.....
Huron, Mich.	4.00	....	....	....	.... 5.00	4.50 4.5	350
Mesnard, Mich.	....	....	....	....	....	....	.....
National, Mich.	....	....	....	1.50	1.50	....	500
Native, Mich.	....	....	....	....	....	....	.....
Oriental & M., Nev.	....	....	....	....	....	....	.....
Phoenix.	....	....	....	....	....	....	.....
Pontiac.	....	....	....	....	....	....	.....
Rappahannock, Va.	....	....	....	....	....	....	.....
Santa Fe, N. Mex.	.40	.... .40	....	.... .43	.40 .45	.40 .4 .45	6,960
Shoshone, Idaho.	....	....	....	....	....	....	.....
South Side, Mich.	....	....	....	....	....	....	.....
Star.	....	....	....	....	....	....	.....
Washington, Mich.	....	....	....	....	....	....	.....
Winthrop, Mich.	....	....	....	....	....	....	.....

Boston: Dividend shares sold, 27,929. Non-dividend shares sold, 15,304. Total Boston, 43,233.

COAL STOCKS.

Name of Company.	Par val. of shares.	Nov. 8. H.	Nov. 8. L.	Nov. 10. H.	Nov. 10. L.	Nov. 11. H.	Nov. 11. L.	Nov. 12. H.	Nov. 12. L.	Nov. 13. H.	Nov. 13. L.	Nov. 14. H.	Nov. 14. L.	Sales.
American Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cambria Iron.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cameron Coal & I. Co	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ches. & O. RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chic. & Ind. Coal RR	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col. C. & I.	100	40	39	38⅞	36	39	35½	39	36¼	38	36½	36	34¼	11,257
Col. & Hocking C. I.	100	23	....	21¾	20	17	15	17⅜	16	17	16¼	18	16	6,800
Consolidation Coal.	100	....	....	....	....	....	....	26	....	....	....	....	....	100
Del. & H. C.	100	136⅜	136⅛	136	132½	134	132½	134	132½	134	132½	134	132½	5,459
D., L. & W. RR.	50	139½	137¾	136¾	133⅞	136½	133¾	137⅛	135¾	137⅜	135⅜	136	131½	126,927
Hocking Valley.	100	28	27½	26¼	25	26	25½	27½	24¾	27¾	25	25	24	4,905
Hunt. & Broad Top.	....	....	....	....	....	....	....	20½	....	21	....	....	....	454
Do. pref.	....	45	44¾	45	44¼	45	44½	45	....	46	45½	....	....	1,304
Illinois C & Coke Co	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lehigh C. & N.	50	51⅛	50¼	50½	49⅝	50½	50¼	50¼	50	51	50¼	....	....	3,279
Lehigh Valley RR.	50	49⅞	....	50	49¾	50	49⅞	50⅜	50	51	50	....	....	5,055
Lehigh & Wilk. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mahoning Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Maryland Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Morris & Essex.	100	....	....	....	....	....	....	....	....	147¼	....	149	148¼	167
New Central Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. J. C. RR.	100	109¼	109	108	105½	108	105	107½	106¾	108	106½	107	105	7,820
N. Y. & S. Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y., Susq. & West	100	6¾	6⅝	6½	....	6½	....	7	6⅞	7⅛	6⅞	7	6¾	2,960
Do. pref.	100	....	....	25¼	24½	24½	....	25½	25	25	....	25	24	2,020
N.Y. & Perry C. & I	100	....	....	....	....	....	....	....	....	101½	9	....	....	326
Norfolk & West. RR.	50	16	....	15½	14	....	....	14½	14¼	17¼	16	....	....	1,960
Do. pref.	50	55¼	54¼	52½	50	53⅞	52	54½	53	54½	53	52½	52	6,794
Penn. Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
Penn. RR.	50	50¼	49⅞	49⅝	49⅛	50⅛	49¾	50⅜	49⅞	50⅜	49⅜	....	....	20.153
Ph. & R. RR.	.....	33	30⅜	29¾	27¾	30	28½	30¾	29¼	33	30	31	29⅝	**312,019
Sunday Creek Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tennessee C. & I. Co.	.....	39	37½	35	33½	34½	30	35	32⅛	36	33	33	32	15,860
Do. pref.	.....	95	....	....	....	78	....	....	....	....	....	....	....	.....
Westmoreland Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	110

**Sales in New York, 200,040; in Philadelphia, 111,979. Total sales, 535,599.

San Francisco Mining Stock Quotations.

Company.	Closing Quotations. Nov. 7.	Nov. 8.	Nov. 10.	Nov. 11.	Nov. 12.	Nov. 13.
Alpha.	.....	.....	.....	.....	.....	.....
Alta.	.....	1.35	1.35	1.25	1.10	1.00
Belcher.	.....	.....	.....	.....	.....	.....
Belle Isle.	.....	1.00	.90	.95	.90	.85
Best & Bel.	.....	3.05	2.85	2.85	2.60	2.75
Bodie.	.....	1.80	1.60	1.30	1.10	1.15
Bulwer.	.....	.35	.....	.35	.30	.35
Chollar.	.....	3.40	3.30	3.55	3.45	3.80
Com'wealth.	.....	2.50	2.80	2.50	2.60	.....
Con. C. & V.	.....	4.30	3.90	4.00	3.65	3.60
Crown Point.	.....	2.50	2.45	2.40	2.20	2.10
D'lMonte,N'v	.....	.....	.....	.....	.....	.....
Eureka C.	.....	.....	3.60	.....	.....	.....
Gould & C.	.....	2.15	2 10	2.10	1.90	1.90
Grand Prize	.....	.....	.....	.....	.....	.....
Hale & N.	.....	2.35	2.20	2.20	2.10	2.15
M. White.	.....	.....	.....	.....	.....	.....
Mexican.	.....	2.80	2.65	2.55	2.45	2.35
Mono.	.....	.....	.75	.70	.60	.55
Mt. Diablo.	.....	.....	.....	.....	.....	.....
Navajo.	.....	.30	.30	.30	.30	.25
Nev. Queen.	.....	.80	1.05	.90	.90	.85
N. Belle Isle.	.....	1.05	.....	1.25	1.10	.....
N.Com'w'lth.	.....	1.50	.....	.....	1.50	.....
Ophir.	.....	4.30	3.95	3.95	3.80	3.90
Potosi.	.....	7.38	7.00	6 75	7.13	7.00
Savage.	.....	2.90	2.50	2.70	2.55	2.30
Sierra Nev.	.....	2.85	2.65	2.65	2.40	2.35
Union Con.	.....	2.50	2.45	2.50	2.35	2.30
Utah.	.....	1.00	.90	.90	.80	.75
Yellow Jak.	.....	2.85	2.60	2.65	2.40	2.35

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	$	$ ....
Balt. & N. C.	.16	.17
Big Vein Coal	.70	...
Conrad Hill	.01	.10
Cons. Coal	.27	.28
Diamond Tunnel	....	.35
George's Crk. C.	1.13	1.15
Lake Chrome	.17	....
Maryland & Charlotte	....	...
North State	.10	....
Silver Valley	.91	.93@1.00

Prices bid and asked, lowest and highest, during the week ending November 13.

Birmingham, Ala.

COMPANY.	Bid. L. H.	Asked. L. H.
Ala. Coal & I. Co.	....	$100
Ala. Conn. C. & C. Co.	....	$23
Ala. R. Mill Co.	$60	....
*Alice Furnace	$103	....
Anna Howe G. Mg. Co.	$⅜	$⅝
Bessemer Land	$33½@$34¾	$34⅞@$35
Bir. Mg. & Mfg.	....	$39¾@$45
Cahaba Coal Mg. Co.	....	$61@$70
Camille Gold Mg. Co.	$½	....
De Bardeleben C. & I. Co.	$60	$65
Decat. L. Imp.	$12	....
Decatur Min. L.	....	$19
Ensley Land	$8¼	$9¾
*Eureka	**$99	$102½
Florence L. & Mg. Co.	$20	$21
Gadsen Land	$3⅜@$3¾	$4⅛@$4¼
Hecla Coal Co.	$10	....
Hen. S. & M. Co.	....	$60
Jagger-Townl'y C. & C. Co.	$8½	$10
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	$25	....
Sheffield C. & I. Co.	$48	$50
Sloss I. & S	$25	$30½@$32
†Sloss I. & S	....	$92
‡‡ Sloss I. & S.	....	$60
Tuscaloose C. I. & L. Co.	$22@$22½	$24
Ten. C. & I. Co.	$39	$40@$41
" pref.	$90	$91
Vulcan C. & C. Co	$5	....
Woodstock I. Co.	....	$30

Prices, highest and lowest, bid and asked during week ending November 10.
* Bonds. † First mortgage. ‡‡ Second mortgage. ** Without interest.

Pittsburg, Pa. Nov. 12.

COMPANY.	B.	A.	Closing.
Allegheny Gas Co.	....	....	....
Bridgewater Gas Co.	$35.00	$50.00	$50.00
Chartiers Val. Gas.	*13.00	*30.00	*25.00
Columbia Oil Co.	....	3.25	3.25
Consolidated Gas Co.	....	....	....
East End E. Light Co.	....	52 00	52.00
East End Gas Co	....	....	....
Forest Oil	....	....	....
Hazlewood Oil Co.	51.00	....	51.00
La Noria Mining	.19	.20	.20
Luster Mg. Co.	*20.00	*22.50	*21.75
Mansfield C. & C. Co.	....	....	....
Manuf'turers Gas Co.	19.00	....	19.00
Nat. Gas Co. of W. Va	....	....	....
N.Y.& Clev.Gas Coal.	*33.00	*37.25	*36.00
Ohio Valley Gas.	*21.00	30.00	24.00
Pennsylvania Gas	....	13.75	13.75
People's Natural Gas.	....	30.00	30.00
People's N. G. & P. Co.	11.25	14.00	12.50
Philadelphia Co.	*22.00	*25.25	*24.00
Pine Run Gas Co.	....	....	....
Pittsburg Gas	75.00	....	75.00
Silverton Mg. Co.	1.75	2.13	2.13
South Side Gas	....	....	....
Tuna Oil Co.	....	....	....
Union Gas	....	....	....
Washington Oil Co.	85.00	96.00	96.00
W'house Brake Co.	....	74.00	74.00
W'house A. B. Co.	110.00	113.50	112.00
W'house E. Light.	*22.75	*28.25	*25.38
W'moreland & Camb.	....	15.00	15.00
Wheeling Gas.	13.00	15.50	15.13
Yankee Girl Mg	....	....	....

Prices bid and asked and sales during week ending Nov. 12:

Chartiers Gas	20 shs.	@*20
Lustre Mining	.156 "	$21@$22
N.Y.&Clev.GasCoal.	20 "	@$36¼
Philadelphia Gas Co.	605 "	$22⅞@$25¼
West. Electric	.157 "	$22¾@$24⅞

* Actual selling price.

St. Louis. Nov. 12.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$1.87¼	$1.90
American & Nettie.	.75	.77½
Aztec, N. Mex.	.10	.11
Bi-Metallic	32.00	....
Central Silver	.22½	.26¼
Cleveland, Colo.	....	....
Cleveland & An'r.	.10	....
Cœur d'Alene	....	....
Elizabeth	2.10	2.17½
Gold King	.15	.16¼
Granite Mountain, Mont.	44.25	45.50
Hope	....	....
Ingram	....	....
I. X. L., Colo.	....	....
La Union	.07¼	.08
Little Albert	.14	.16¼
Montrose Placer, Colo.,	.50	.51¼
Major Budd, Mont.	.06	.08
Mexican Imp.	....	....
Mickey Breen.	1.47½	1.52½
Mountain Key	.45	.50
Nellie	....	....
Old Colony	....	....
Pat Murphy, Colo.	.11½	....
Puzzle	....	....
Richmond Hill	....	....
Samoa	....	....
Silver Age, Colo.	1.95	2 10
Small Hopes, Colo.	.87½	.92½
Tourtelotte	....	....
West Granite, Mont.	1.07½	1.12½
Wire Patch	.12	.13
Yuma, Ariz.	.55	.58¾

Trust Stocks. Nov. 14.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

Am. Cotton Oil. Tr. Repts.	$16½@$16⅝
Cattle Trust	@ ....
Distillers' & Cattle Feeders'.	41 @ 41½
Linseed Oil	41¼@ 41¾
National Lead	16⅛@ 16⅜
Standard Oil	....@ ....
Sugar Refineries	53 @ 53¼

Sales at the New York Stock Exchange week ending Nov. 14:

	Sales.	Price H.	Price L.
*American Cotton Oil	2,251	17⅛	15¼
National Lead	89.682	17⅜	15⅛
Sugar	184,425	59½	51½

* Trust receipts.

Foreign Quotations.

COMPANY.	London. Highest.	Nov. 1. Lowest.
Almada, Mex.	1s. 3d.	9d.
Amador, Cal.	£⅛	£⅜
Appalachian, N. C.	9d.	3d.
Canadian Phos., Can.	£⅛	£¼
Colorado, Colo.	3s. 9d.	3s. 3d.
Comstock, Utah.	....	....
Cordova	....	....
Cons. Esmeralda, Nev.	2s. 9d.	2s. 3d.
Denver Gold, Colo.	6d.	....
Dickens Custer, Idaho.	1s.	6d.
East Arevalo, Idaho.	2s.	1s.
El Callao, Venezuela.	£2	£1¾
Elmore, Idaho	2s. 6d.	2s.
Garfield, Nev	1s. 6d.	6d.
Jay Hawk, Mont.	1s. 6d.	1s.
Josephine, Cal.	1s. 6d.	6d.
Kohinoor, Colo.	2s. 3d.	1s. 9d.
La Luz, Mex.	1s. 6d.	1s.
La Valera, Mex.	20s.	15s.
Montana Lt., Mont.	20s. 6d.	19s. 6d.
New California, Colo.	6s. 9d.	6s. 3d.
New Consolidated	9d.	3d.
New Eberhardt, Nev.	1s. 3d.	9d.
New Emma, S., Utah.	3s. 9d.	3s. 3d.
New Flagstaff, Utah.	....	...
Newfoundland, N. F.	3s. 6d.	3s.
N. Gold Hill, N. C.	1s.	6d.
New Guston, Colo.	£4	£3½
New Hoover Hill, N.C.	1s.	6d.
Old Lout, Colo	£⅛	£¼
Palmarejo, Mex.	14s. 6d.	13s. 6d.
Pinos Altos, Mex.	£5⅝	£9-16
Pittsburg Cons., Nev.	8s. 6d.	7s. 6d.
Richmond Con., Nev.	£1	£¾
Ruby&Dunderb'g, Nev.	1s. 6d.	1s.
Sam Christian, N. C.	1s.	6d.
Sierra Buttes, Cal.	5s. 6d.	4s. 6d.
" Plumas Eur., Cal.	£11-16	£9-16
Sonora, Mex	1s.	6d.
United Mexican, Mex.	8s.	7s.
U. S. Placer, Colo.	1s. 3d.	9d.
Viola Lt., Idaho	1s. 6d.	1s.

Highest and lowest prices during the week ending November 1.

Paris.

	Oct. 30. Francs.
Belmez, Spain	765.00
Callao, Venez	53.50
Callao Bis., Venez	6.50
East Oregon, Ore	5.50
Forest Hill Divide, Cal	90.00
Golden River, Cal	225.00
" " parts	30.00
Lexington, Mont	121.25
" parts	3.75
Rio Tinto, Spain	616.25
Tharsis, Spain	152.50

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18° ℔ 100 lbs. 1.00@1.50
Muriatic, 20° ℔ 100 lbs. 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36° ℔ 100 lbs. 4.00@4.29
Nitric, 42° ℔ 100 lbs. 6.00@6.25
Oxalic, ℔ 100 lbs. 6.50@10.50
Sulphuric, 60° ℔ 100 lbs. 80@1.25
Sulphuric, 66° ℔ 100 lbs. 1.00@1.75

Alkali—
Refined, 48 p. c. 2¾
Refined, 58°. 2¾@3

Alum—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1¾@2
Lump ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10

Ammonia—Sul., ℔ 100 lbs. 3.15
Carb, ℔ lb. 7½@8½

Aqua Ammonia—18° ℔ lb. 4¾
20°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11

Ammoniates—Azotine, ℔ unit 1 95@ 2 00
Blood, dried, red, ℔ unit, west 1 80@ 1 90
low grade, ℔ unit 1 70@ 1 80
Concentrated tankage, ℔ unit 1 75@ 1 80
Bones, rough, ℔ ton 20 00@23 00
ground, ℔ ton 25 00@28 00
Bone black, refuse, ℔ ton 17 50@19 50
Kieserite 6 00@ 6 50
Fish guano, dried 18 50@19 00
acidulated 10 00@— 00
wet 8 50@ 9 50
Phosphate rock, f. o. b Char'n— —@— —
undried —@ 6 —
dried 7 00@ 7 50
ground 8 00@11 50
Acid phosphate, 14% per unit. 72½@ 75

Arsenic—White, powdered ℔ lb. 3¼@3½
Red ℔ lb. 5¾@.¾
White at Plymouth, ℔ ton £12 2 6

Asbestos—Am., ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60

Ashes—Pot, 1st sorts, ℔ lb. 4¾@4⅞
Pearl 6¼@6½

Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5¼c.
Hard Cuban, P ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian 8@9

Barium—Nitrate, ℔ lb. 8@8½

Barytes—Sulph., Am. prime white 17@20
Sulph., foreign, floated, ℔ ton. 19½@21.50
Sulph., off colors, ℔ ton. 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1 Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " 3 15 0

Bleach—Over 35 p. c. ℔ lb. 1.57½@1.60

Borax—Refined, ℔ lb. 9¼@9⅝
Concentrated 7¾@8⅜
Refined " Liverpool ℔ ton £29

Brimstone—*See Sulphur.*

Bromine—℔ lb. 37@38

Chalk—℔ ton 1.75
Precipitated, ℔ lb. 4¾@5

China Clay—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50

Chrome Yellow—℔ lb. 10@2

Cobalt—Oxide, ℔ lb. 2.60@2.90

Copper—Sulph. English Wks. ton £20@£21

Copperas—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks. £1 15s.

Cream of Tartar—Am. 99%. 22½
Powdered, 99 p. c. 23

Emery—Grain, ℔ lb. 4½@5
Flour, ℔ lb. 2¾@3½

Feldspar—Ground, ℔ ton. 15.00

Fuller's Earth—Lump, ℔ bbl. 90@95
Powdered, ℔ lb. 1⅞@2

Gypsum—Calcined, ℔ bbl. 1.25@1.50

Iodine—Resublimed. 2.75

Kainit—℔ ton $9.75@$10

Kaolin—*See China Clay.*

Lead—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb. 8½@8¾
Acetate, or sugar of, white. 12@13
Nitrate 9@10

Lime Acetate—Amer. Brown .95@1.00
" Gray 1.75@1.87½

Litharge—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. 9@9½

Magnesite—Greek, ℔ ton. 20.00

Manganese—Crude, per unit. 23@28
Oxide, ground, per lb. 2½@6½

Mercurie Chloride—(*Corrosive Sublimate*) ℔ lb. 70@72

Metallic Paint—Brown per ton. $20@25
Red. $20@25

Mineral Wool—℔ lb. 2

Mica—In sheets according to size.
1st quality, ℔ lb. 25@$6.00

Naphtha—Black. 60

Ochre—Yellow, "B. F.," ℔ ton, f. o. b. mill. 30.00
"J. F. L. S.," ℔ lb. ex dock 2½
Yellow 10@25
Rochelle 1.35@1.50
Washed Dutch 5@—
Washed French 1½@2½
Washed Nat Oxford, Lump 6½@6¾
Washed Nat Oxford, Powder 7@7½
Golden 3¾@4
Domestic ¾@1½
Domestic, for O. C. & W. P. ¾@1

Oils, Mineral—
Cylinder, light filtered 15@20
Dark filtered 14@21
Extra cold test —@—
Dark steam refined 10@18

Phosphate Rock—S. Carolina, per ton f. o. b. Charleston 6.00@7.25
Ground, ex vessel New York 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00

Phosphorus—℔ lb. 64@65
Precip., red 100@102
white 100@103

Plumbago—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7

Potassium—Cyanide, ℔ lb. 39@40
Bromide, ℔ lb 33
Chlorate, English, ℔ lb. 11@14
Chlorate, powdered 13@14
Carb, ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs. 1.77½@1.82½
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Dble. m'ure salt, basis of 48@50%, 1.12@1.20
Sulphate, basis of 90% ℔ 100 lbs. 2.02½@2.05
Yellow Prussiate 17½@18
Red Prussiate 42@45

Pumice Stone—Select lumps, ℔ lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½

Pyrites—Non-cupreous, p. units 10d.

Quartz—Ground, ℔ ton. 14.00@16.00

Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 6@10

Salt—Liverpool, ground, ℔ sack 75@80
Turk's Island, ℔ bush. 25@28
Salt Cake—℔ lb. 60@62½
Saltpeter—Crude, ℔ lb. 5¼@5½
Refined, ℔ lb. 6@8
Silex, ℔ ton. 14@25
Soda—Carb Ash. 48%. $1.90@1.55
" high test. 1.50@1.55
Caustic, 48%. 1.50@1.55
" high test. — @ —
Newcastle, 48%. — @ —
" high test. 1.50@1.55
Bicarb, English. 3.50@3.75
" American. 3@3½
Crystal, carbonate. 1.95@2.00
Caustic, 60%. 3.40@5.50
" 70%. 3.15@3.25
" 74%. 3.15@3.25
" 77%. 3.15@3.20
Sal, English. 1.15@1.25
" American. 1.10@1.15
Nitrate. 1.80@1.85
Prussiate. 17½@18
Phosphate .7@18
Stannate. 8@15
Strontium—Nitrate, ℔ lb. 9@9½
Sulphur—Roll, ℔ lb. 1¾
Flour, ℔ lb. 20
Crude Brimstone, 2s., ℔ ton. 22.00@23.00
Crude Brimstone, 3ds, ℔ ton. 20.50@21.50
Ylvinit, 23@27%, S. F. P., per unit. 40@42½
Talc—Ground French, ℔ lb. 1¼@1½
Domestic, ℔ ton. $18@$20
c. i. f. Liverpool, ℔ ton. £4 5
Terra Alba—French. 80@85
English. 75@80
American, No. 1. —@—
American, No. 2. 40@50
Tin—Crystals. 15½@16
Muriate. .8@ 3
Vermillion—American, ℔ lb. 61
English ℔ lb 82@85
Vitriol—(Blue), Ordinary, ℔ lb. 5½@5⅝
Extra, ℔ lb. 7
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb 6½@7
* Spot.

THE RARER METALS.

Aluminum—(Metallic), per lb. $1.50@$2
Sheet, per lb 2.50
Arsenic—(Metallic), per lb. .40
Barium—(Metallic), per gram. 4.00
Bismuth—(Metallic), per lb. 2.75
Cadmium—(Metallic), per lb. 1.00
Calcium—(Metallic), per gram. 10.00
Cerium—(Metallic), per gram. 7.50
Chromium—(Metallic), per gram. 1.00
Cobalt—(Metallic), per lb. 6.00
Didymium—(Metallic), per gram. 9.00
Erbium—(Metallic), per gram. 7.50
Gallium—(Metallic), per gram. 140.00
Glucinum—(Metallic), per gram. 12.00
Indium—(Metallic), per gram. 9.00
Iridium—(Metallic), per oz. 7.00
Lanthanum—(Metallic), per gr. 10.00
Lithium—(Metallic), per gram. 10.00
Magnesium—Per lb. 4.50
Manganese—(Metallic), per lb. 1.10
Chem. pure, per oz. 10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), ger gram. 5.00
Osmium—(Metallic), per oz. 65.00
Palladium—(Metallic), per oz. 35.00
Platinum—(Metallic), per oz. 15.00
Potassium—(Metallic), per lb. 28.00
Rhodium—(Metallic), per gram. 5.00
Ruthenium—(Metallic), per gm. 5.50
Rubidium—(Metallic), per gram. 2.00
Selenium—(Metallic), per oz. 1.80
Sodium—(Metallic), per lb. 2.50
Strontium—(Metallic), per gm. .60
Tantallum—(Metallic), per gram. 9.00
Telurium—(Metallic), per lb. 5.00
Thallium—(Metallic), per gram. .25
Titanium—(Metallic), per gram. 2.25
Thorium—(Metallic), per gram. 17.00
Tungsten—(Metallic), per oz. 2.25
Uranium—(Metallic), per lb. 5.00
Vanadium—(Metallic), per gm. 22.00
Yttrium—(Metallic), per gram. 9.00
Zirconium—(Metallic), per oz. 65.00

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000. 3.50@4.00
Jerseys, ℔ 1,000. 5.00@5.50
Up Rivers, ℔ 1,000. 6.25@6.50
Haverstraw seconds, ℔ 1,000. 5.50@6.00
Haverstraw firsts, ℔ 1,000. 6.25@7.00
Fronts, nominal, ℔ 1,000 .....
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore .....

Building Stone—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu. ft. 45@1.25
Granite, Scotch, ℔ cu. ft. 1.00@1.15

Cement—Rosendale, ℔ bbl. 85@1.10
Portland, American, ℔ bbl. 2.15@2.45
Portland, foreign, ℔ bbl. 2.40@2.50
Portland, " special brands 2.60@2.85
Roman, ℔ bbl. 2.75@2.90
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.25@8.50

Slate—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black roofing, ℔ 100 sq. ft. 4.25@5.50

Lime—Rockland, common, ℔ bbl. 1.00
Reckland, finishing, ℔ bbl. 1.20
St. John, com. and finish., ℔ bbl. 90@ 95
Glens Falls, com. and fin., ℔ bbl. 85@1.10

Labor—Ordinary, ℔ day. 1.50@2.00
Masons, ℔ day. 4.00
Plasterers, ℔ day. 4.00
Carpenters, ℔ day. 3.50
Plumbers, ℔ day. 3.50
Painters, ℔ day. 2.50@3.50
Stonesetters, ℔ day. 3.50@4.00
Tilelayers, ℔ day. 3.50@4.50
Bricklayers, ℔ day. 4.00